CITY DESIGN & CONSTRUCTION STANDARDS

2013

MAYOR: W. WESLEY PERRY

COUNCIL MEMBERS

1 – JEFF SPARKS | 2 – JOHN B. LOVE, III | 3 – JOHN JAMES

4 – MICHAEL TROST | AT LARGE – SCOTT DUFFORD | AT LARGE – JERRY MORALES

CITY MANAGER: COURTNEY SHARP

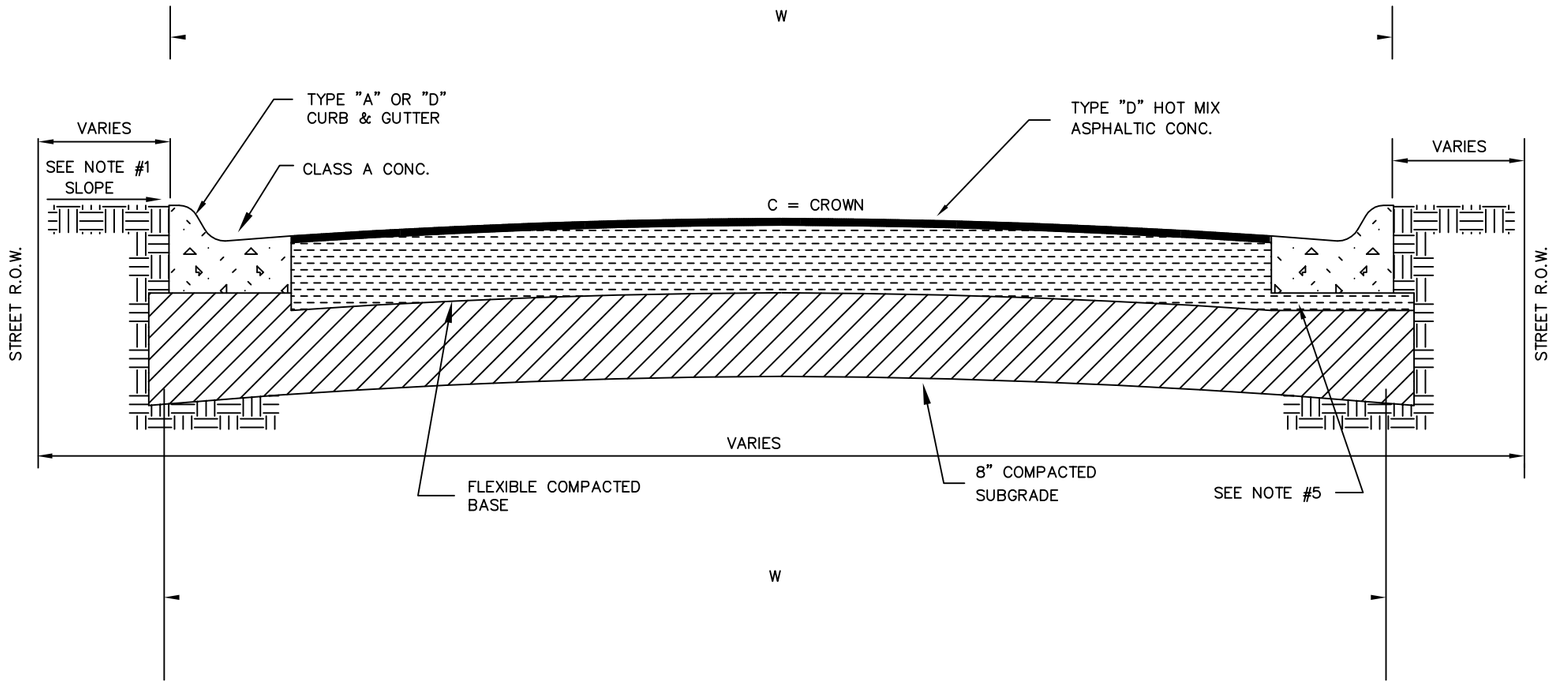
ENGINEERING SERVICES DEPARTMENT

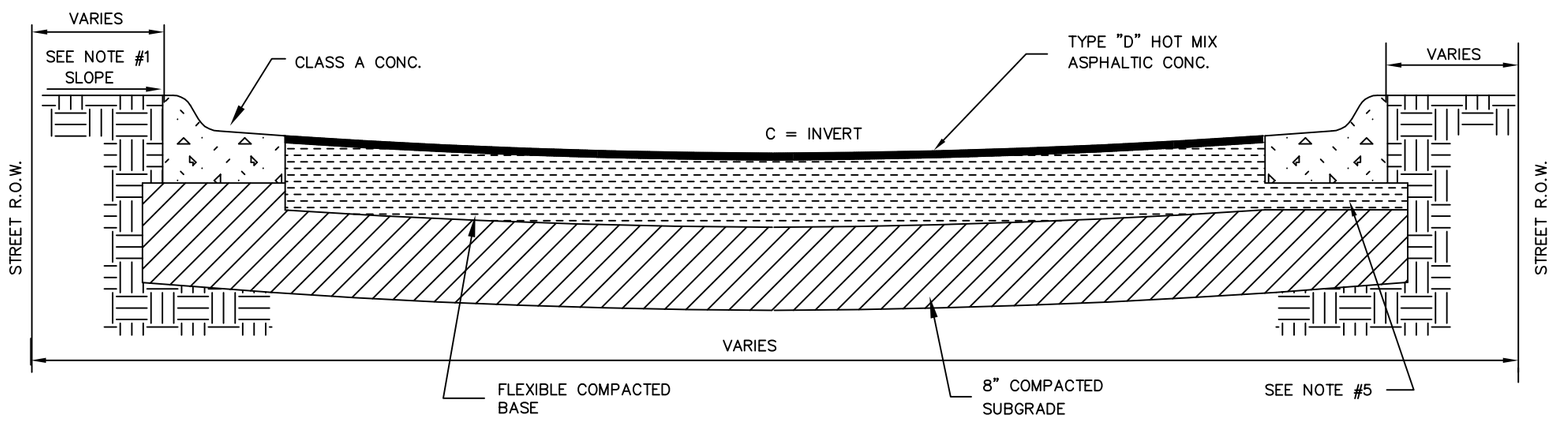
DIRECTOR
JOSE E. ORTIZ

CITY OF MIDLAND
300 N. LORAINE ST.
TEXAS, 79702

CITY ENGINEER
DAVID D. BEARD, P.E.

LAST REVISION: **7-25-2013**





	ASPHALT THICKNESS	BASE THICKNESS
WHERE W = 31' – C = 4"	1 3/4"	8"
" W = 37' – C = 4 1/2"	1 3/4"	8"
" W = 41 – C = 5"	1 3/4"	8"
" W = 46 – C = 5 1/2"	1 3/4"	8"
" W = 51' – C = 6"	3"	10"
" W = 56' – C = 6 1/2"	3"	10"
" W = 61' – C = 7"	3"	10"
" W = 65' – C = 8"	3 1/2"	12"
" W = 68' – C = 8"	3 1/2"	12"
" W = 72' – C = 8 1/2"		
" W = 76' – C = 9"		
" W = 81' – C = 10"		
" W = 86' – C = 10 1/2"		

SEE PLAN AND PROFILE SHEETS AND BID PROPOSAL FOR ASPHALT AND BASE THICKNESS FOR THESE STREETS.

1. THE MAXIMUM SLOPE OF 1/4" /FT. SHALL BE MEASURED FROM THE TOP OF CURB AND SHALL APPLY TO THE FULL WIDTH OF THE AREA BETWEEN THE BACK OF CURB AND THE PROPERTY LINE (R.O.W. LINE).

2. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.

3. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CITY OF MIDLAND STANDARD SPECIFICATIONS.

4. COMPACTED SUBGRADE SHALL EXTEND 6" BEYOND BACK OF CURB.

5. WHEN THE DEPTH OF CALICHE BASE IS 3" OR MORE BELOW THE BOTTOM OF THE CONCRETE CURB, EXTEND THE FIRST BASE COURSE TO 6" BEYOND THE BACK OF CURB.

6. IF THE PLANS OR THE SPECIFICATIONS REQUIRE A DIFFERENT STREET SECTION (PAVING, BASE, OR OTHERWISE) THEN THESE STANDARDS, THE PLANS AND SPECIFICATIONS WILL GOVERN.

7. THE FORMULA FOR MINIMUM STREET CROWN IS $(\frac{W}{100})12 = C$ ADJUSTED TO THE NEAREST 1/2" WHERE W IS THE STREET WIDTH FROM BACK Of CURB TO BACK OF CURB, C IS THE CROWN HEIGHT ABOVE THE LIP OF THE GUTTER SECTION.

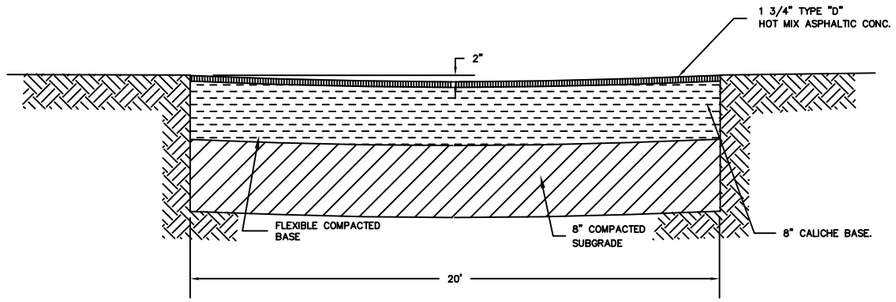
8. INVERTED CROWNS ARE THE INVERSE OF THE STANDARD CROWN AND ARE COMPUTED IN THE SAME MANNER.

Rev. No.	Date	By	Description

MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Street Section

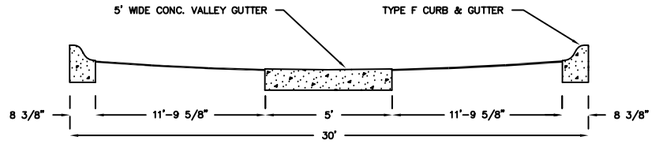
Dwg. Name	st_sec07	Dwg. No.	P–1
Drawn By	V.M. Lowe		
Checked By	R. Franks	Date	October 2007
Approved By	J.P. Robertson	Scale	N.T.S.



1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.

2. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CITY OF MIDLAND STANDARD SPECIFICATIONS.

3. THE MINIMUM DEPTH FOR ANY UTILITY LINE OR SERVICE LINE PLACED IN AN ALLEY AHEAD OF PAVING SHALL BE 30" BELOW FINISHED CENTER LINE GRADE.



DRAINAGE ALLEY

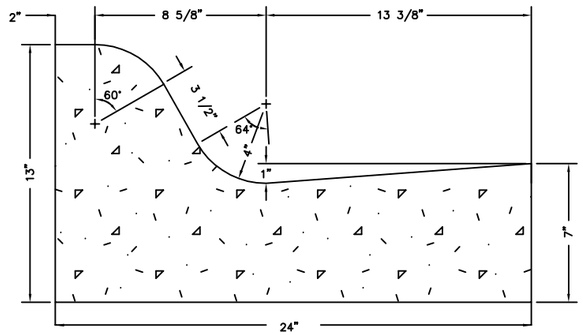
Rev. No.	Date	By	Description

MIDLAND Engineering Services

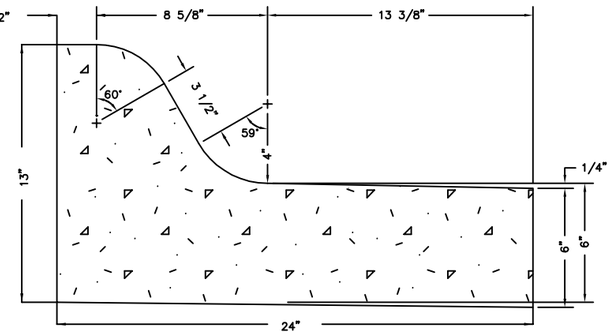
Engineering Services Division
Development Services Department
City Design and Construction Standards
Alley Section

Dwg. Name	Aley_sec07
Drawn By	V. M. Lowe
Checked By	R. Franks
Approved By	J.P. Robertson

Dwg. No.	P-2
Date	October 2007
Scale	N.T.S.

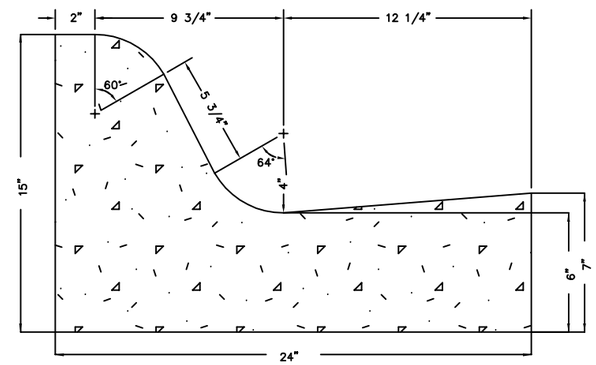


Type "A"

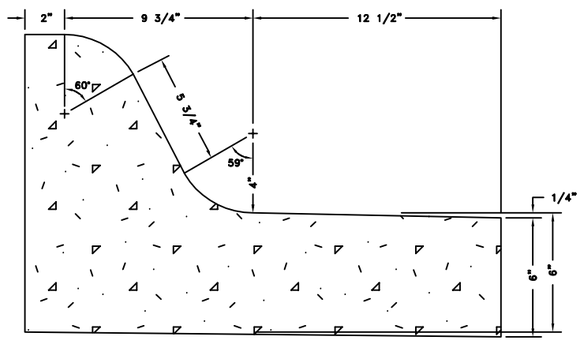


Type "B"

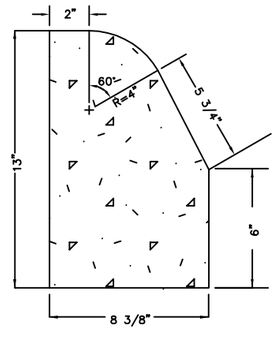
1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.
2. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CITY OF MIDLAND STANDARD SPECIFICATIONS.
3. USE TYPE "C-R" CURB WHEN LAY-DOWN CURB IS CALLED FOR ON THE SECTION TO BE PLACED MONOLITHIC WITH DRIVEWAY, ALLEY RETURN,



Type "D"

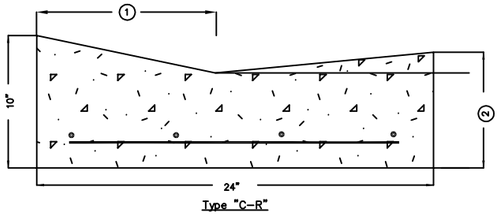


Type "E"

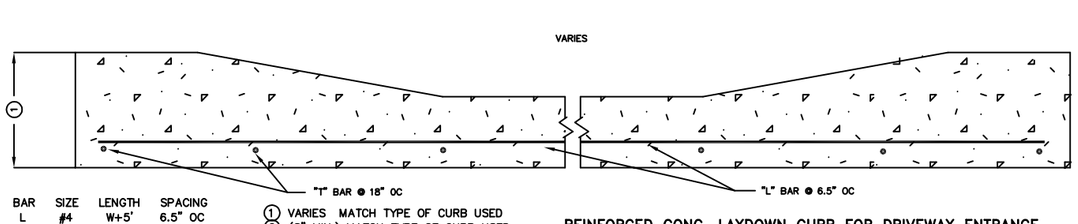


ALLEY CURB FOR DRAINAGE ALLEYS

Type "F"



Type "C-R"



BAR	SIZE	LENGTH	SPACING
L	#4	W+5'	6.5" OC
T	#3	21"	18" OC

(1) VARIES MATCH TYPE OF CURB USED
(2) (8" MIN.) MATCH TYPE OF CURB USED

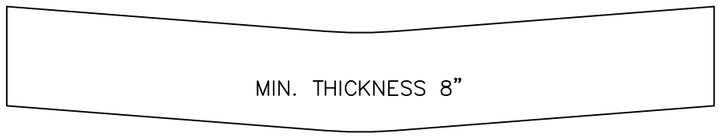
REINFORCED CONC. LAYDOWN CURB FOR DRIVEWAY ENTRANCE

Rev. No.	Date	By	Description

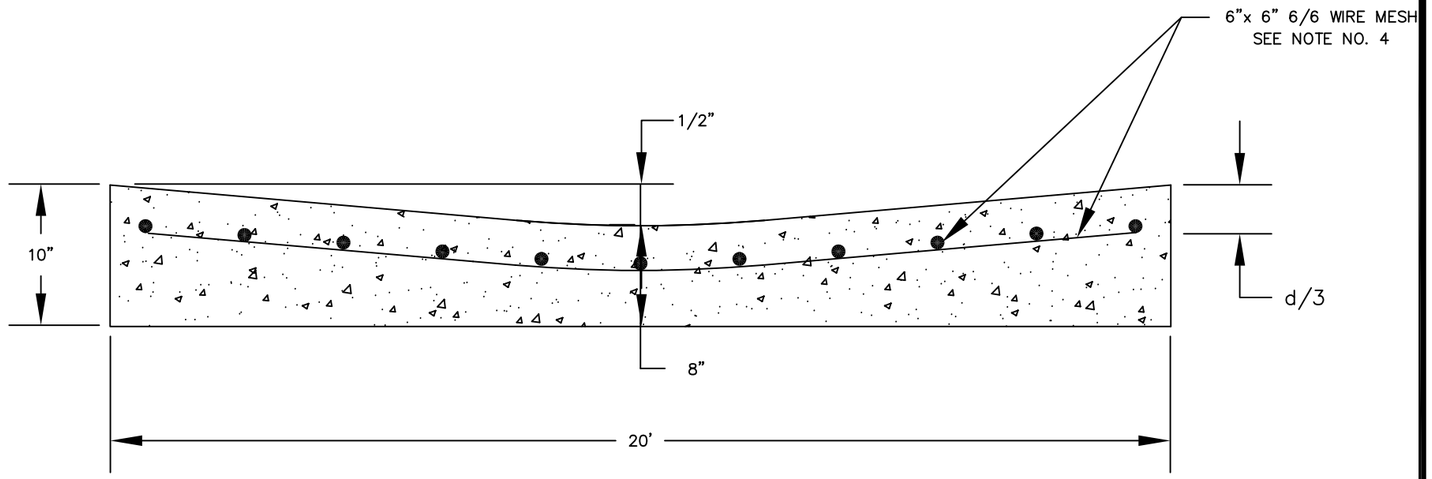
MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Curb & Gutter Details

Dwg. Name	curb_gut07	Dwg. No.	P-3
Drawn By	V.M. Lowe		
Checked By	R. Franks	Date	October 2007
Approved By	J.P. Robertson	Scale	N.T.S.

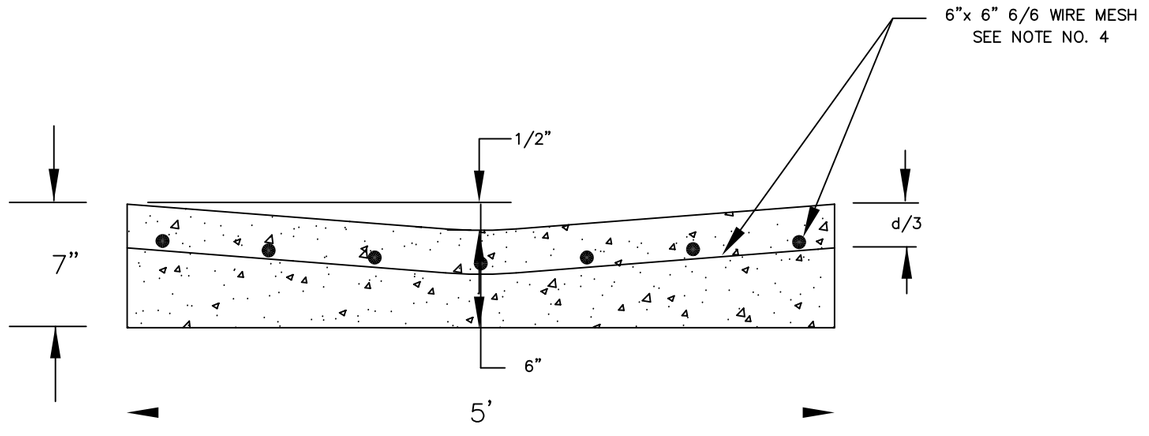


ALTERNATE SHAPE



HIGH TRAFFIC ARTERIAL STREET

1. CONCRETE SHALL BE CITY OF MIDLAND CLASS ”A” AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.
2. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CITY OF MIDLAND STANDARD SPECIFICATIONS.
3. ALL WIRE REINFORCING SIZES ARE GAGE.
4. THE CONTRACTOR MAY AT HIS OPTION USE FIBERMESH OR CAPROLAN–RC OR APPROVED EQUAL IN LIEU OF 6” x 6” 6/6 GAGE WIRE MESH REINFORCING.



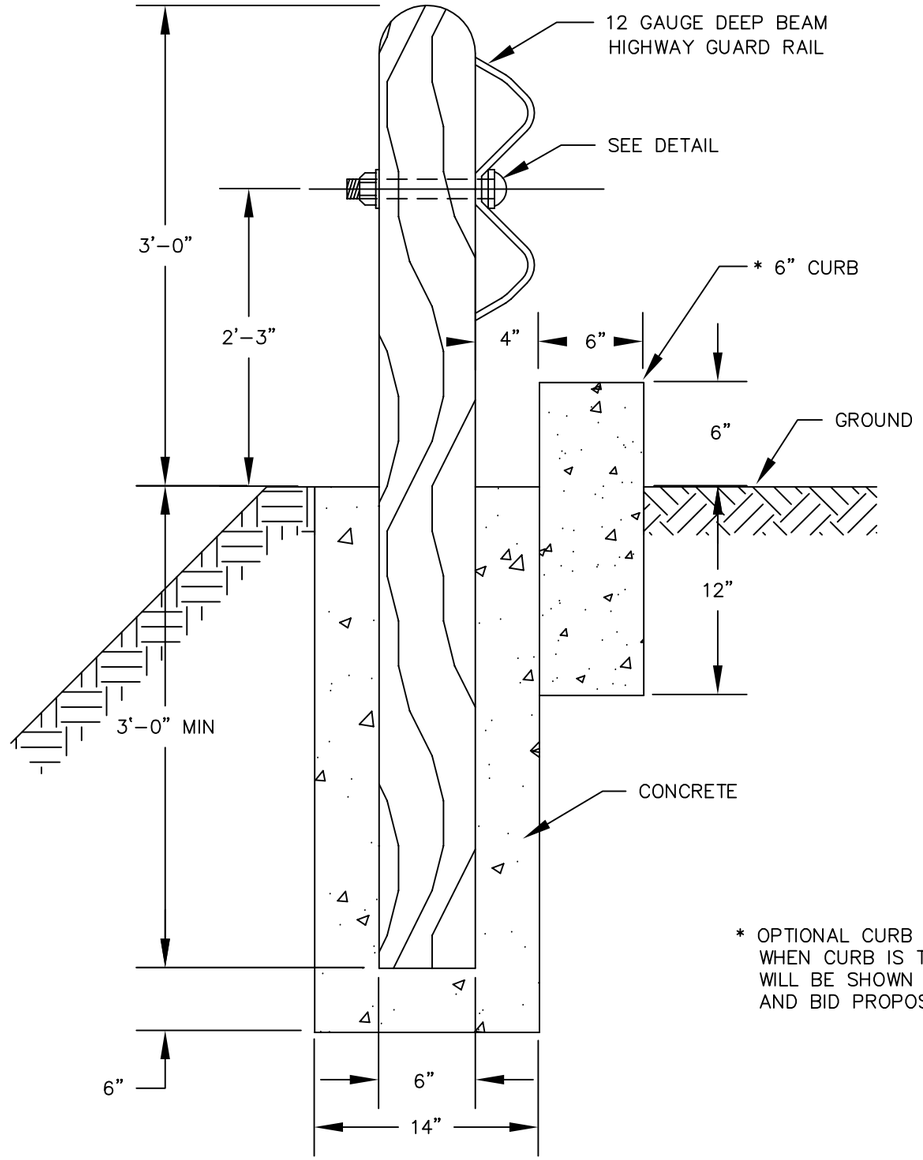
COLLECTOR AND RESIDENTIAL STREETS

Rev. No.	Date	By	Description

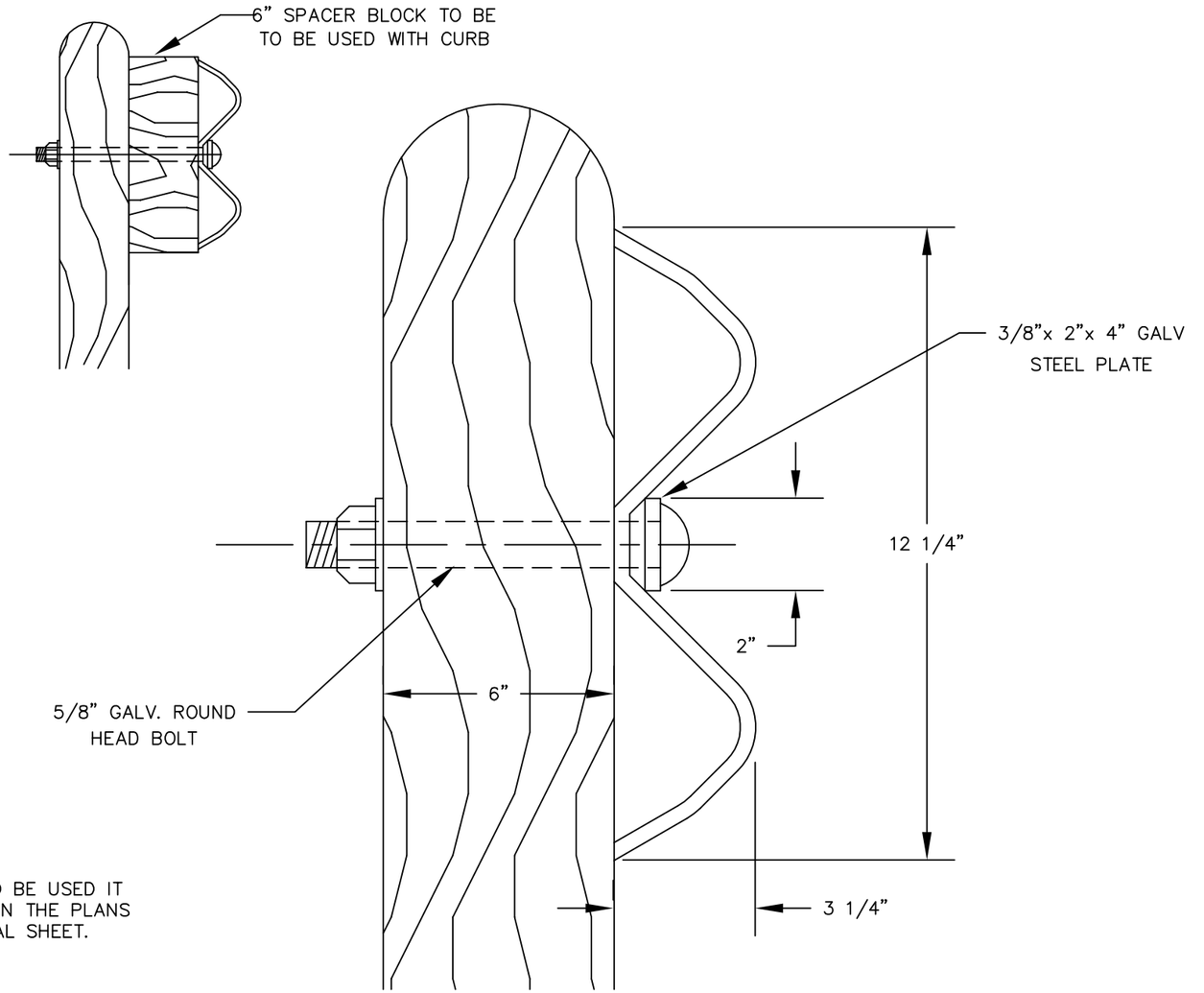
MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Concrete Center Invert For Streets

Dwg. Name	inv_sect07	Dwg. No.	P–4
Drawn By	V.M. Lowe		
Checked By	R. Franks	Date	October 2007
Approved By	J.P. Robertson	Scale	N.T.S.



* OPTIONAL CURB
WHEN CURB IS TO BE USED IT
WILL BE SHOWN ON THE PLANS
AND BID PROPOSAL SHEET.

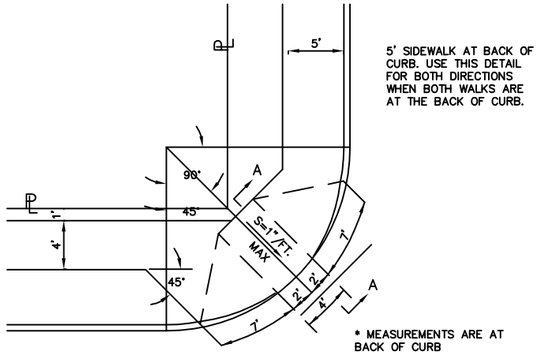


Rev. No.	Date	By	Description

MIDLAND Engineering Services

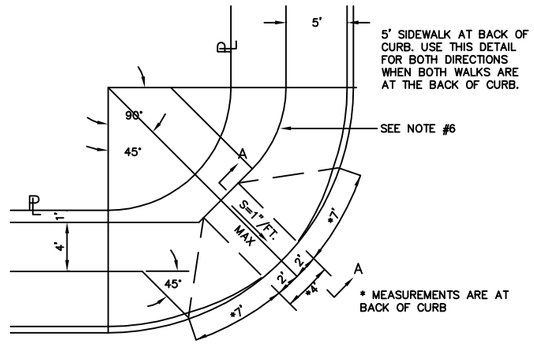
Engineering Services Division
Development Services Department
City Design and Construction Standards
Wood Post With Guard Rail

Dwg. Name	wp_guard07	Dwg. No.	P-5
Drawn By	V.M. Lowe		
Checked By	R. Franks	Date	October 2007
Approved By	J.P. Robertson	Scale	N.T.S.



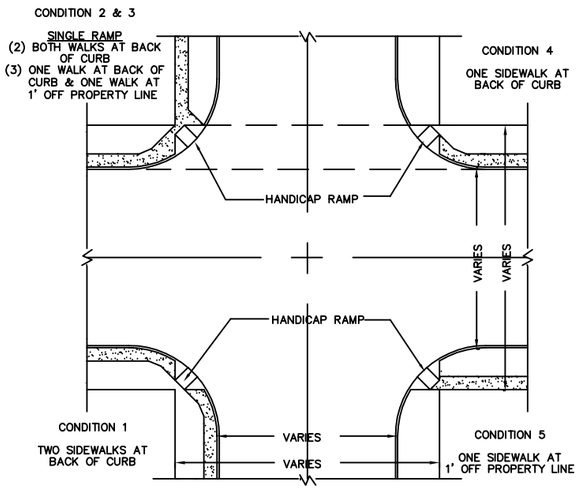
4' SIDEWALK 1' OFF PROPERTY LINE
USE THIS DETAIL FOR BOTH DIRECTIONS
WHEN BOTH WALKS ARE 1' OFF
PROPERTY LINE.

STANDARD HANDICAP RAMP
15' CURB RADIUS

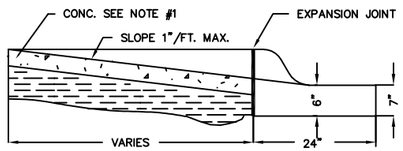


4' SIDEWALK 1' OFF PROPERTY LINE
USE THIS DETAIL FOR BOTH DIRECTIONS
WHEN BOTH WALKS ARE 1' OFF
PROPERTY LINE.

STANDARD HANDICAP RAMP
20' CURB RADIUS



CONFIGURATION MAY VARY SLIGHTLY
DUE TO SITE CONDITIONS



HANDICAP RAMP
SECTION A–A

1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.
2. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CITY OF MIDLAND STANDARD SPECIFICATIONS
3. ALL SIDEWALKS AND RAMPS SHALL HAVE COARSE BROOM FINISH OR OTHER ROUGH NON-SKID TYPE FINISH AS APPROVED BY THE ENGINEER.
4. THE STANDARD LOCATION FOR HANDICAP RAMPS IS THE CENTER OF THE CURB RETURN RADIUS.
5. STREET RADII SHOWN ARE THE MOST COMMONLY USED.FOR OTHER RADII HANDICAP RAMPS WILL BE OF SIMILAR CONSTRUCTION. IN NO CASE SHALL THE RAMP SLOPE BE GREATER THAN 1"/FT. IN ANY DIRECTION.
6. FOLLOW RADIUS CURVATURE OF BACK OF CURB FOR BACK EDGE OF THE SIDEWALK SO THAT THE MINIMUM WIDTH FOR SIDEWALK AT ANY POINT IS 5' WIDE.

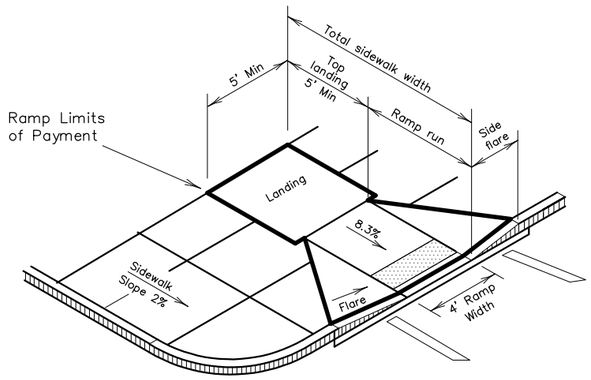
Rev. No.	Date	By	Description

MIDLAND Engineering Services

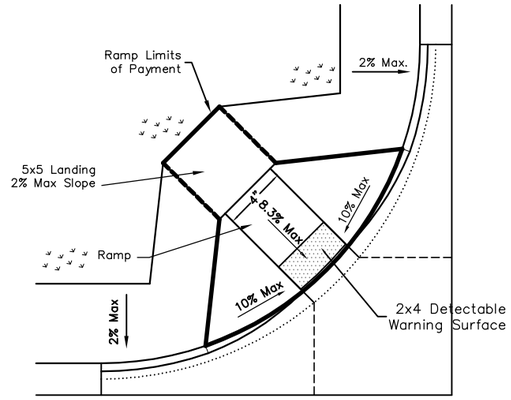
Engineering Services Division
Development Services Department
City Design and Construction Standards
Handicap Ramp

Dwg. Name	handi_ramp07
Drawn By	V.M. Lowe
Checked By	R. Franks
Approved By	J.P. Robertson

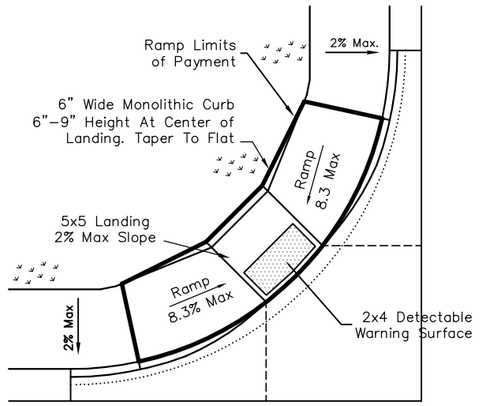
Dwg. No.	P–6
Date	October 2007
Scale	N.T.S.



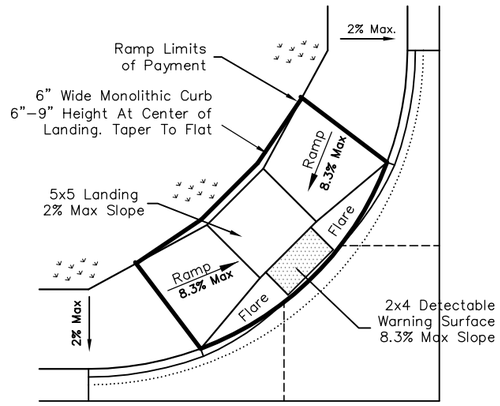
Type 1: Perpendicular Curb Ramp



Type 8: Diagonal Curb Ramp



Type 12: Diagonal Curb Ramp
For Narrow or Obstructed ROW
Ramp To Be Used Only after
Permission From City Engineering
Department Has Been Given
685–7286



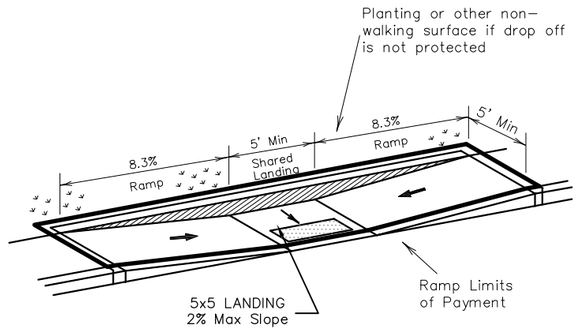
Type 4: Diagonal Combination Curb Ramp

CURB RAMP NOTES:

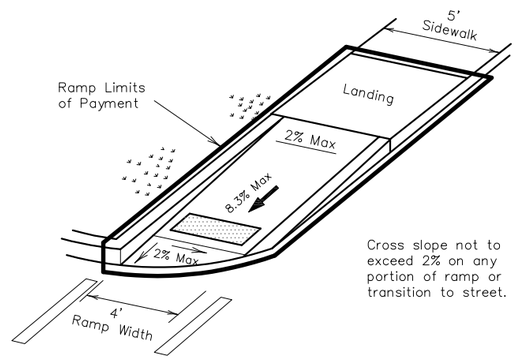
1. All slopes are maximum allowable. The least possible slope that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
2. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
3. Maneuvering space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
4. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
5. Curb ramps with returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planting or other non–walking surface or because the side approach is substantially obstructed. Otherwise, provide flared sides.
6. Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
7. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall be aligned with theoretical crosswalks, or as directed by the Engineer.
8. Provide a smooth transition where the curb ramps connect to the street.
9. Flare slope shall not exceed 10% measured along curb line
10. Adjust curb ramp location and or type so that no obstruction is located within the landing area.

SIDEWALK NOTES:

1. Where obstructions in sidewalk exist, there shall be a 3' minimum clearance. Sidewalk location may be shifted with the approval from engineering division.
2. The minimum sidewalk width is 5' where the sidewalk is adjacent to the back of curb on all new construction except on arterials (highways and 5 lane streets). Sidewalks on arterials shall be 4' wide at 1' off property line.
3. All sidewalks and ramp with a concrete surface shall have a coarse broom finish or other rough non–skid type finish as approved by the engineering division.



Type 2: Parallel Curb Ramp



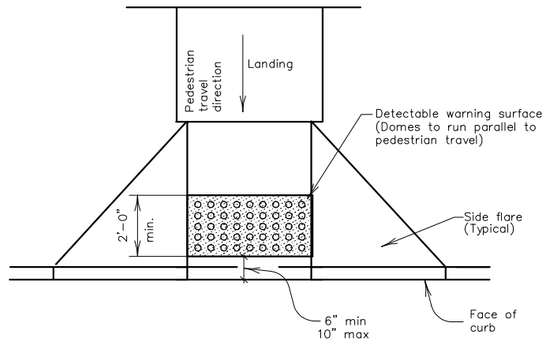
Type 10: Directional Ramp Within Radius

Rev. No.	Date	By	Description

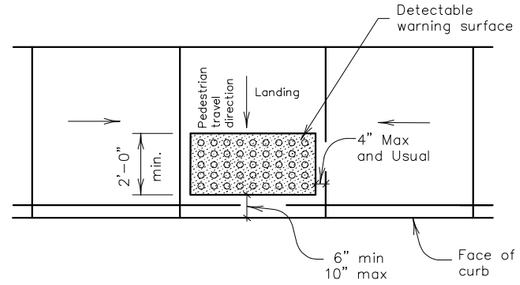
MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Pedestrian Curb Ramps

Dwg. Name	CurbRamp09	Dwg. No.	P–6a
Drawn By	V.M. Lowe		
Checked By	A.R.Karch	Date	February, 2009
Approved By	R.Franks	Scale	N.T.S.



Typical placement of detectable warning surface on sloping ramp run.



Typical placement of detectable warning surface on landing at street edge.

1. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 4.29 of the Texas Accessibility Standards (TAS). The surface must contrast visually with adjoining surfaces, including side flares. Furnish dark brown or dark red detectable warning surface adjacent to uncolored concrete, unless specified elsewhere in the plans.

2. Detectable warning surfaces must be slip resistant and not allow water to accumulate.

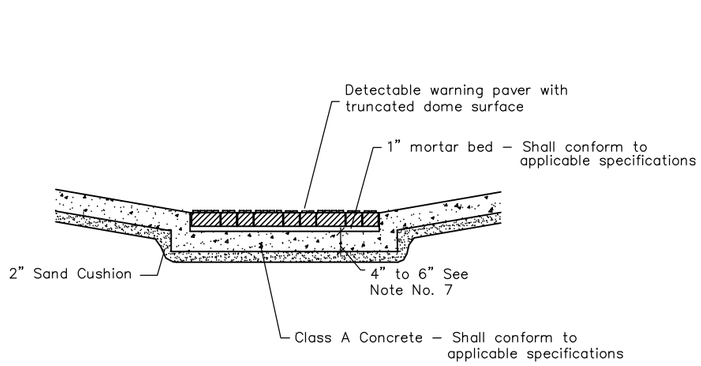
3. Align truncated domes in the direction of pedestrian travel when entering the street.

4. Shaded areas on Sheet 6a indicate the approximate location for the detectable warning surface for each curb ramp type.

5. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.

6. Detectable warning surfaces shall be located so that the edge nearest the curb line is a minimum of 6" and a maximum of 10" from the extension of the face of curb. Detectable warning surfaces may be curved along the corner radius.

7. Place 6" of concrete in ramps, landings, and flares that are located at the returns adjacent to the back of curb of arterial streets and commercial sites.



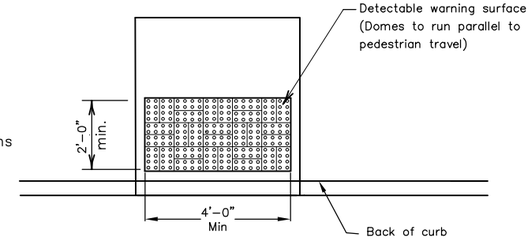
SECTION THROUGH PAVERS

PAVER NOTES:

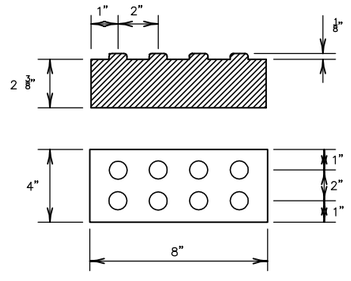
Detectable warning pavers may vary in size as shown. Units must meet all requirements of ASTM C–936, C–33. Lay in a two unit basket weave pattern or as directed.

Lay full–size units first followed by closure units consisting of at least 25 percent of a full unit. Cut detectable warning paver units using a power saw.

The contractor at his option may use an alternative detectable warning surface such as Armor–Tile ADA Sound Amplifying Detectable/Tactile Warning Surface Tile or equal and approved by the engineer as meeting all requirements of ASTM C–936, C–33



Truncated Dome Pattern



Detectable Warning Paver

Rev. No.	Date	By	Description

MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Detectable Warnings

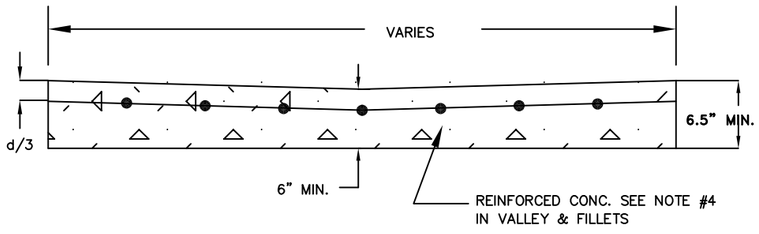
Dwg. Name	CurbRamp09	Dwg. No.	P–6b
Drawn By	V.M. Lowe		
Checked By	A.R.Karch	Date	February, 2009
Approved By	R.Franks	Scale	N.T.S.

BACK OF	FILLET AREAS (90°)			CURB LENGTH
CURB R.	COMPUTING R.	AREA S.F.	AREA S.Y.	L.F.
8	10	21.46	2.38	12.56
12	14	42.06	4.67	18.85
15	17	62.01	6.89	23.56
18	20	85.84	9.54	28.27
20	22	103.86	11.54	31.42
25	27	156.44	17.38	39.27
30	32	219.75	24.42	47.12
35	37	293.79	32.64	54.98
40	42	378.56	42.06	62.83
45	47	474.06	52.67	70.69
50	52	580.28	64.48	78.54

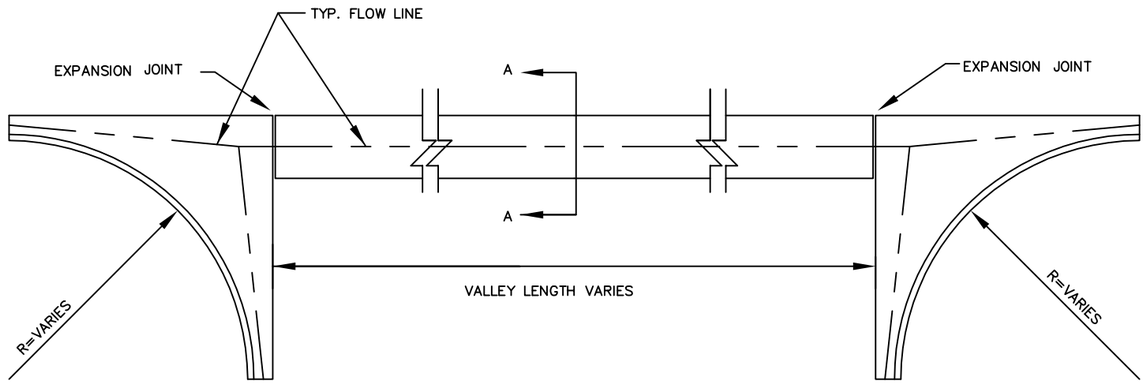
VALLEY GUTTER	WIDTHS	THICKNESS	
		C.L.	EDGE
RESIDENTIAL ST.	5'	6"	6.5"
MINOR COLLECTOR	5'	6"	6.5"
MAJOR COLLECTOR	10'	6.5"	7.0"
MINOR ARTERIAL	20'	7.5"	8.0"
MAJOR ARTERIAL	SEE PLANS		

1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.
2. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CITY OF MIDLAND STANDARD SPECIFICATIONS.
3. ALL WIRE REINFORCING SIZES ARE GAGE.
4. THE CONTRACTOR MAY AT HIS OPTION USE 6" x 6" 6/6 GAGE WIRE MESH REINFORCING. IN LIEU OF FIBERMESH OR CAPROLAN RC OR APPROVED EQUAL.
5. FOR THICKNESS SEE VALLEY GUTTER TABLE THIS SHEET.
6. WHEN FILLET AREA IS TO BE PAVED WITH 8" THICK CONCRETE THE BOTTOM OF THE CURB AND GUTTER WILL BE EXTENED TO MATCH THE FILLET THICKNESS.
7. CONCRETE FILLET AREA SHALL BE PLACED MONOLITHIC WITH CURB.
8. ALL REINFORCING STEEL SHALL BE PLACED AT THE UPPER 1/3 POINT OF SLAB CONCRETE ON GRADE AND SHALL HAVE A MINIMUM COVER OF 2".

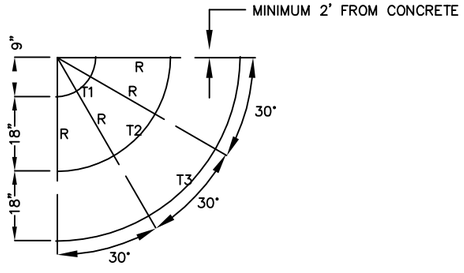
SECTION A–A



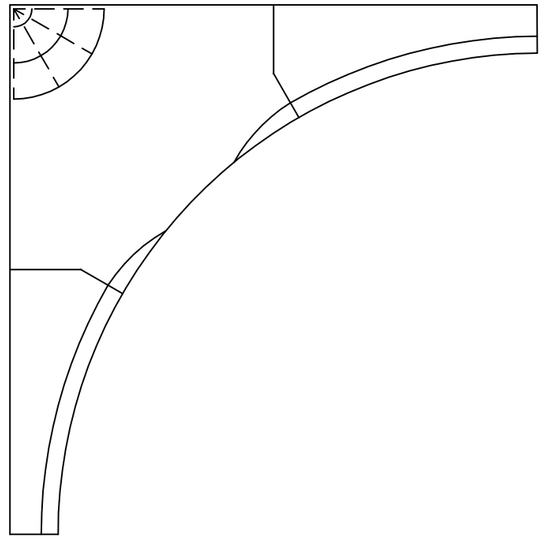
CONCRETE VALLEY CUTTER



REINFORCEING WHEN USING FIBERMESH



BAR	SIZE	LENGTH	NO.	BENDING R.
R	#4	4'– 0"	4	
T1	#3	1'– 3"	1	0'– 9"
T2	#3	3'– 7.5"	1	2'– 3"
T3	#3	6'– 0"	1	3'– 9"



Rev. No.	Date	By	Description

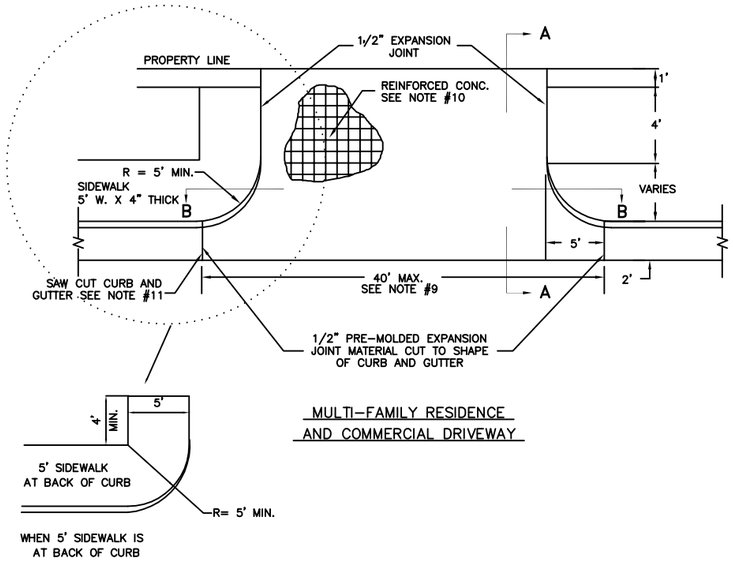
MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

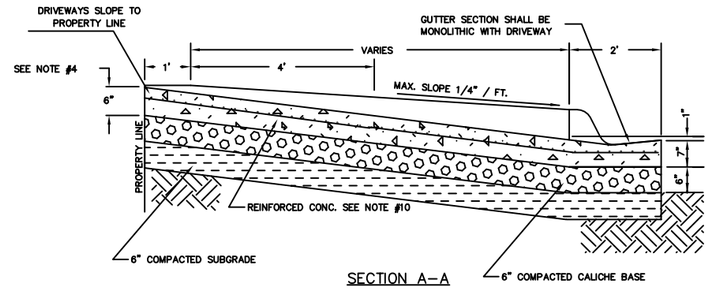
PAVING DETAILS
VALLEY GUTTER & FILLETS

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	P–7
Approved By	D. BEARD		

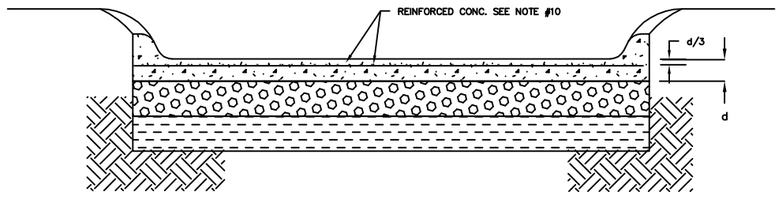
File: H:\detail\Details 2011\010val_gut_fil11.dwg



MULTI-FAMILY RESIDENCE AND COMMERCIAL DRIVEWAY



SECTION A-A



SECTION B-B

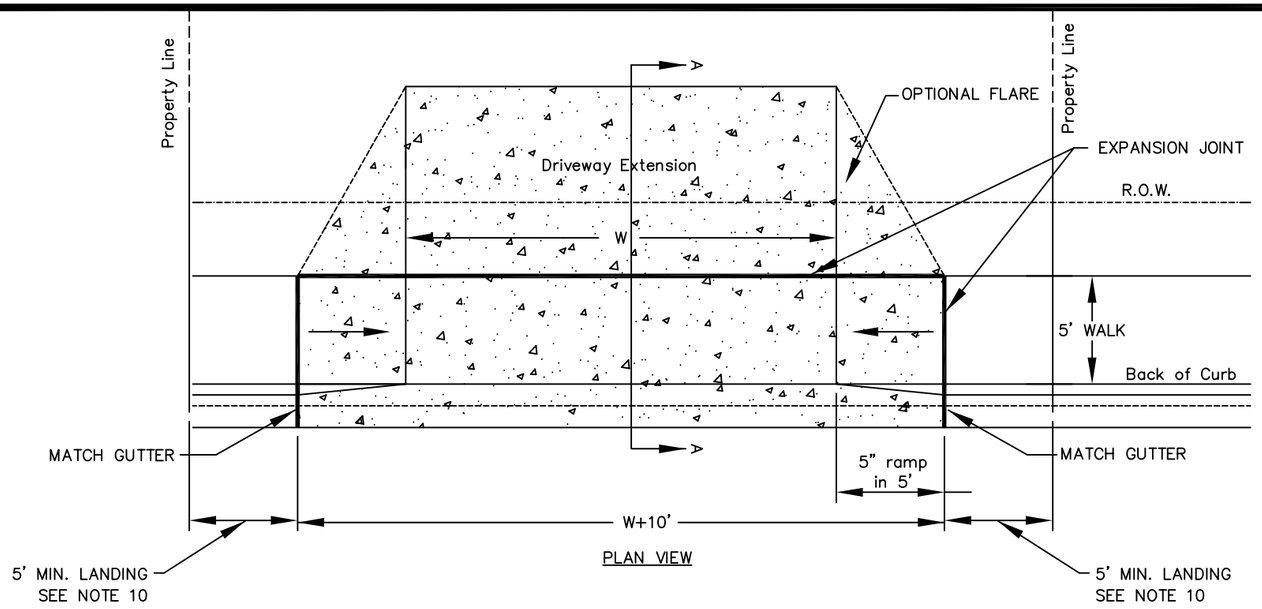
1. THE MINIMUM ELEVATION FOR THE DRIVEWAY AT THE PROPERTY LINE OR 25' BACK OF CURB, WHICHEVER COMES FIRST, SHALL BE THE TOP OF CURB ELEVATION.
2. OVER-EXCAVATION BELOW THE GRADE REQUIRED SHALL BE CORRECTED BY PLACING EXTRA CALICHE BASE OR BY THE USE OF SHARP GRAINED CONCRETE SAND OR CRUSHER FINES (CHAT).
3. DRIVEWAY SHALL BE CONSTRUCTED 6" OR 8" THICK THROUGH THE SIDEWALK AREA.
4. THE CONTRACTOR, AT HIS OPTION, MAY ELECT TO PLACE 8" OF CONCRETE INSTEAD OF PLACING 6" OF CONCRETE OVER 6" OF CALICHE BASE IN ALLEYS AND COMMERCIAL DRIVEWAYS.
5. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.
6. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CITY OF MIDLAND STANDARD CONSTRUCTION SPECIFICATIONS.
7. ALL SIDEWALKS AND RAMPS SHALL HAVE COARSE BROOM FINISH OR OTHER ROUGH NON-SKID TYPE FINISH AS APPROVED BY THE ENGINEER.
8. ALL WIRE REINFORCING SIZES ARE GAGE.
9. THE CITY ENGINEER MAY APPROVE WIDER OPENINGS FOR COMMERCIAL DRIVES TO ACCOMMODATE DIVIDED ENTRY/EXIT AND ANGLED DRIVES ON HIGH VOLUME, HIGH SPEED STREETS.
10. THE CONTRACTOR MAY AT HIS OPTION USE FIBERMESH OR CAPROLAN-RC OR APPROVED EQUAL IN LIEU OF 6" x 6" 6/6 GAGE WIRE MESH REINFORCING.
11. IF REMOVING CURB & GUTTER TO THIS LINE WILL LEAVE A SECTION OF CURB & GUTTER LESS THAN 4' IN LENGTH, THE CURB AND GUTTER SHALL BE REMOVED TO THE NEAREST JOINT INSTEAD OF SAWING.

Rev. No.	Date	By	Description

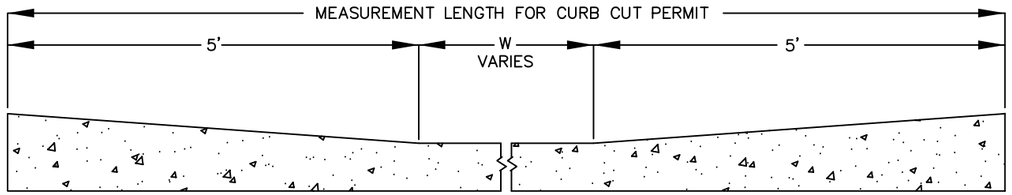
MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Multi-Family & Commercial Drive Approach

Dwg. Name	mult_com_app07	Dwg. No.	P-8
Drawn By	V.M. Lowe		
Checked By	R. Franks	Date	October 2007
Approved By	J.P. Robertson	Scale	N.T.S.

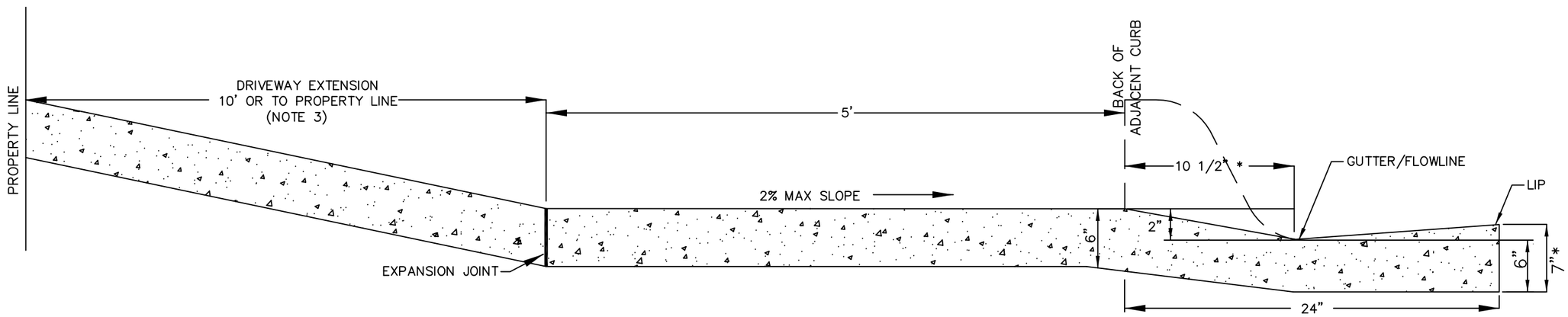


PLAN VIEW



SECTION THROUGH BACK OF CURB

1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.
2. THE CONTRACTOR SHALL USE FIBERMESH OR APPROVED EQUAL FOR CRACK CONTROL.
3. DRIVEWAY SHALL BE CONSTRUCTED 6" THICK FROM CURB TO PROPERTY LINE, OR 10' BEHIND CURB ON WIDER RIGHT-OF-WAYS.
4. MATCH GUTTER/FLOWLINE ELEVATION ON EACH END OF DRIVEWAY. WATER MUST FLOW IN GUTTER ACROSS THE DRIVEWAY.
5. ALL SIDEWALKS AND RAMPS SHALL HAVE COARSE BROOM FINISH OR OTHER ROUGH NON-SKID TYPE FINISH AS APPROVED BY THE ENGINEER.
6. THE MINIMUM ELEVATION FOR THE DRIVEWAY AT THE PROPERTY LINE OR 25' BACK OF CURB, WHICHEVER COMES FIRST, SHALL BE THE TOP OF CURB ELEVATION.
7. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CITY OF MIDLAND STANDARD CONSTRUCTION SPECIFICATIONS.
8. OVER-EXCAVATION BELOW THE GRADE REQUIRED FOR THE DRIVEWAY SHALL BE CORRECTED BY PLACING EXTRA CONCRETE AT THE TIME THE DRIVEWAY IS PLACED OR BY USE OF SHARP GRAINED CONCRETE SAND OR CRUSHER FINES (CHAT) OR BY PLACING AND COMPACTING NATIVE SOIL IN THE AREA OVER EXCAVATED. NATIVE SOIL SHALL BE COMPACTED TO AT LEAST THE DENSITY OF THE SURROUNDING UNDISTURBED GROUND.
9. IF REMOVING CURB & GUTTER TO THIS LINE WILL LEAVE A SECTION OF CURB & GUTTER LESS THAN 4' IN LENGTH, THE CURB AND GUTTER SHALL BE REMOVED TO THE NEAREST JOINT INSTEAD OF SAWING.
10. LANDING MAY BE CLOSER THAN 5' FROM PROPERTY LINE WITH ADJOINING PROPERTY OWNER'S CONSENT. CONSENT FORMS ARE AVAILABLE IN ENGINEERING SERVICES. APPROVAL FROM ADJOINING PROPERTY OWNER DOES NOT GUARANTEE ENGINEERING SERVICES APPROVAL. UNDER NO CIRCUMSTANCE WILL RAMP START IN FRONT OF ADJOINING PROPERTY OWNER'S PROPERTY.
11. THIS DETAIL ONLY APPLIES WHEN ADJACENT PROPERTY IS NOT AN ALLEY. A MINIMUM 15' IS REQUIRED BETWEEN DRIVEWAY THROAT AND ALLEY PAVING.



SECTION A-A

* OR MATCH ADJACENT CURB

Rev. No.	Date	By	Description

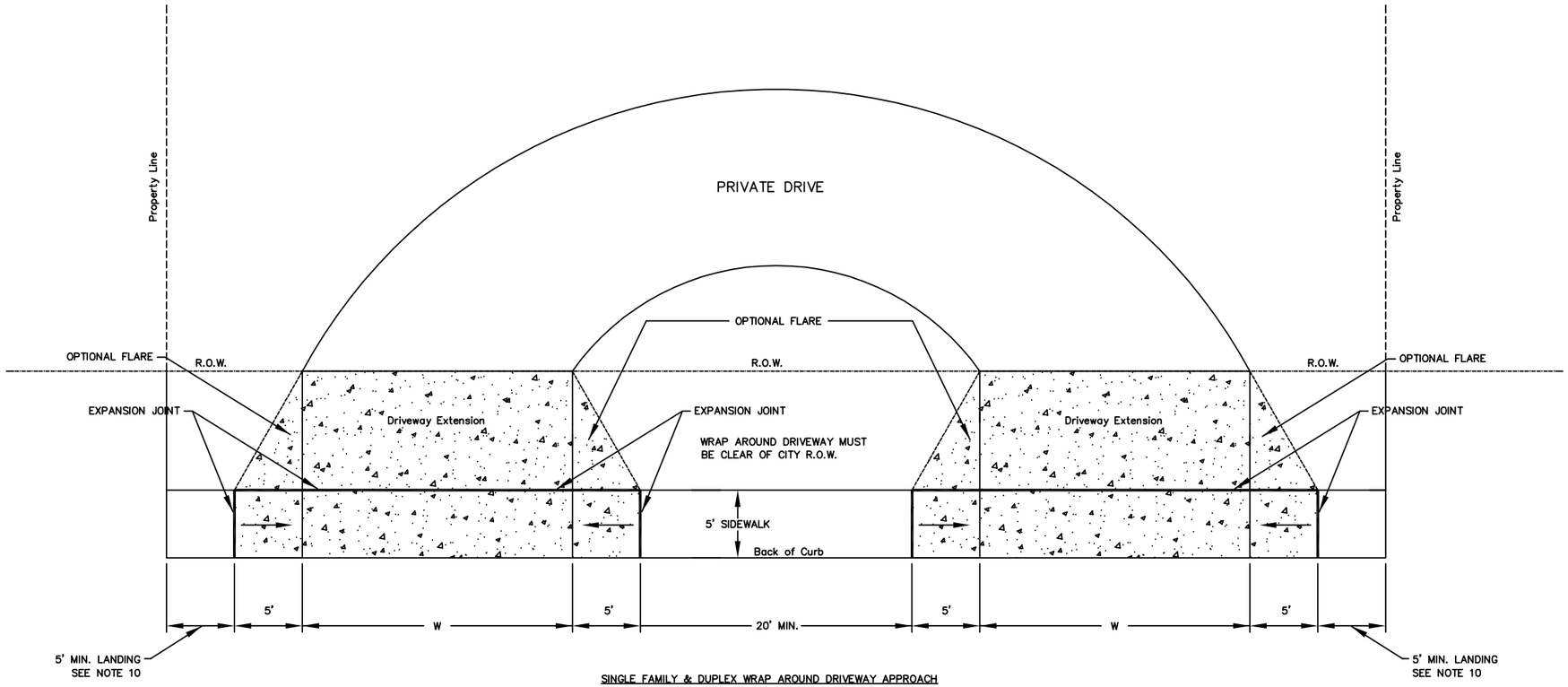
MIDLAND Engineering Services

ENGINEERING SERVICES DEPARTMENT

PAVING DETAILS
SINGLE FAMILY & DUPLEX DRIVEWAY APPROACH

Date	MARCH 2012	Horiz. Scale	N.T.S.
Drawn By	V.M. LOWE	Vert. Scale	N.T.S.
Designed By	S. SWONKE	Dwg. No.	P-9
Approved By	D. BEARD		

File: H:\detail\Details 2011\012sing_dup_app11.dwg



SINGLE FAMILY & DUPLEX WRAP AROUND DRIVEWAY APPROACH

1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.
2. THE CONTRACTOR SHALL USE FIBERMESH OR APPROVED EQUAL FOR CRACK CONTROL.
3. DRIVEWAY SHALL BE CONSTRUCTED 6" THICK FROM CURB TO PROPERTY LINE, OR 10' BEHIND CURB ON WIDER RIGHT-OF-WAYS.
4. MATCH GUTTER/FLOWLINE ELEVATION ON EACH END OF DRIVEWAY. WATER MUST FLOW IN GUTTER ACROSS THE DRIVEWAY.
5. ALL SIDEWALKS AND RAMPS SHALL HAVE COARSE BROOM FINISH OR OTHER ROUGH NON-SKID TYPE FINISH AS APPROVED BY THE ENGINEER.
6. THE MINIMUM ELEVATION FOR THE DRIVEWAY AT THE PROPERTY LINE OR 25' BACK OF CURB, WHICHEVER COMES FIRST, SHALL BE THE TOP OF CURB ELEVATION.
7. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CITY OF MIDLAND STANDARD CONSTRUCTION SPECIFICATIONS.
8. OVER-EXCAVATION BELOW THE GRADE REQUIRED FOR THE DRIVEWAY SHALL BE CORRECTED BY PLACING EXTRA CONCRETE AT THE TIME THE DRIVEWAY IS PLACED OR BY USE OF SHARP GRAINED CONCRETE SAND OR CRUSHER FINES (CHAT) OR BY PLACING AND COMPACTING NATIVE SOIL IN THE AREA OVER EXCAVATED. NATIVE SOIL SHALL BE COMPACTED TO AT LEAST THE DENSITY OF THE SURROUNDING UNDISTURBED GROUND.
9. IF REMOVING CURB & GUTTER TO THIS LINE WILL LEAVE A SECTION OF CURB & GUTTER LESS THAN 4' IN LENGTH, THE CURB AND GUTTER SHALL BE REMOVED TO THE NEAREST JOINT INSTEAD OF SAWING.
10. LANDING MAY BE CLOSER THAN 5' FROM PROPERTY LINE WITH ADJOINING PROPERTY OWNER'S CONSENT. CONSENT FORMS ARE AVAILABLE IN ENGINEERING SERVICES. APPROVAL FROM ADJOINING PROPERTY OWNER DOES NOT GUARANTEE ENGINEERING SERVICES APPROVAL. UNDER NO CIRCUMSTANCE WILL RAMP START IN FRONT OF ADJOINING PROPERTY OWNER'S PROPERTY.
11. CONSTRUCT APPROACHES AS DETAILED ON SINGLE FAMILY & DUPLEX DRIVEWAY APPROACH DETAIL.
12. THIS DETAIL ONLY APPLIES WHEN ADJACENT PROPERTY IS NOT AN ALLEY. A MINIMUM 15' IS REQUIRED BETWEEN DRIVEWAY THROAT AND ALLEY PAVING.

Minimum Lot Width for Wrap-Around Driveways			
Driveway Width (FT) (w)	Lot Width (FT): No Standup Curb Waiver Agreement	Lot Width (FT): 1 Standup Curb Waiver Agreement	Lot Width (FT): 2 Standup Curb Waiver Agreement
10	70	65	60
11	72	67	62
12	74	69	64
13	76	71	66
14	78	73	68
15	80	75	70
16	82	77	72
17	84	79	74
18	86	81	76
19	88	83	78
20	90	85	80
21	92	87	82
22	94	89	84
23	96	91	86
24	98	93	88
25	100	95	90
26	102	97	92
27	104	99	94
28	106	101	96
29	108	103	98
30	110	105	100

Rev. No.	Date	By	Description

MIDLAND Engineering Services

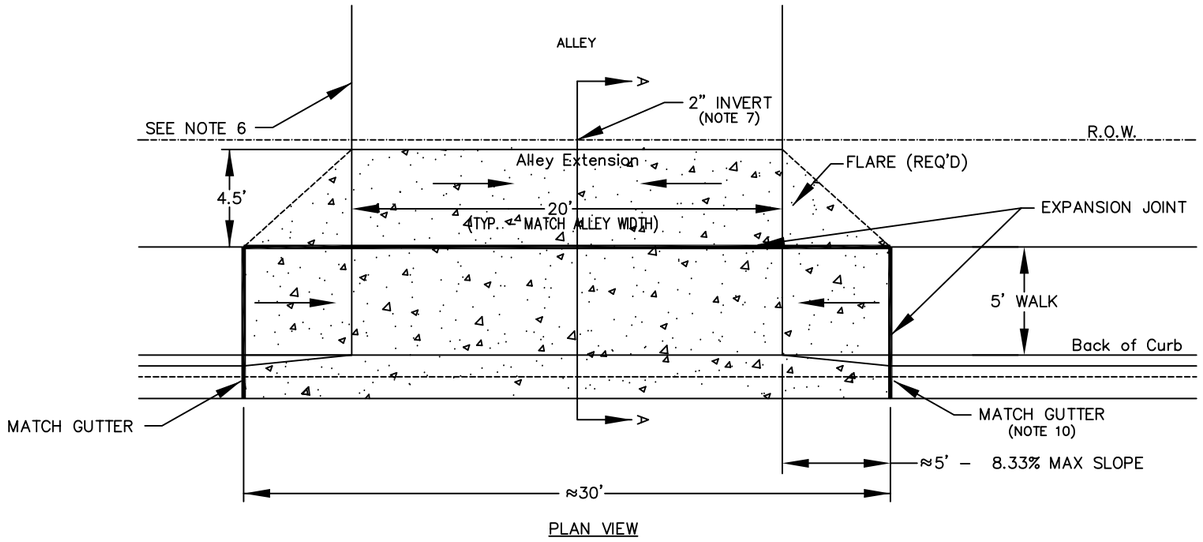
ENGINEERING SERVICES DEPARTMENT

PAVING DETAILS

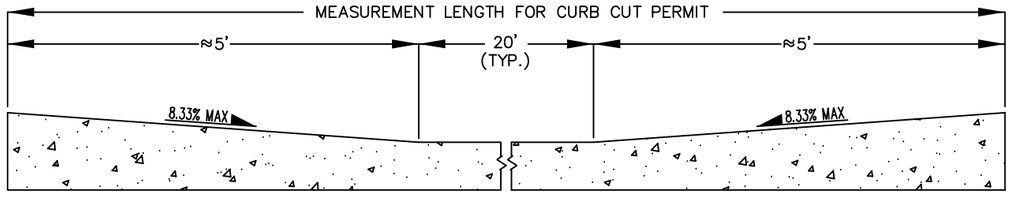
SINGLE FAMILY & DUPLEX WRAP-AROUOND DRIVEWAY LAYOUT

Date	MARCH 2012	Horiz. Scale	N.T.S.
Drawn By	V.M. LOWE	Vert. Scale	N.T.S.
Designed By	S. SWONKE	Dwg. No.	P-9a
Approved By	D. BEARD		

File: H:\detail\Details 2011\013sing_dup_wraparound_drv_app11.dwg

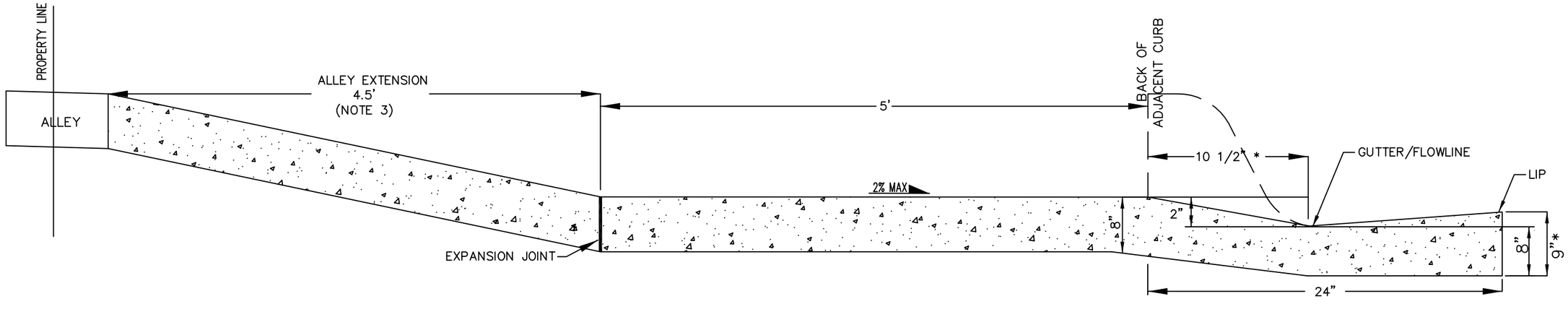


PLAN VIEW



SECTION THROUGH BACK OF CURB

1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.
2. THE CONTRACTOR SHALL USE FIBERMESH OR APPROVED EQUAL FOR CRACK CONTROL.
3. ALLEY APPROACH SHALL BE CONSTRUCTED 8" THICK FROM CURB TO PROPERTY LINE, OR 4.5' BEHIND CURB. ALTERNATIVELY, 6" CONCRETE MAY BE PLACED ON COMPACTED 6" CALICHE BASE.
4. MATCH GUTTER/FLOWLINE ELEVATION ON EACH END OF ALLEY APPROACH. WATER MUST FLOW IN GUTTER ACROSS THE ALLEY APPROACH.
5. ALL SIDEWALKS AND RAMPS SHALL HAVE COARSE BROOM FINISH.
6. THE MINIMUM ELEVATION FOR NEW ALLEYS AT THE PROPERTY LINE OR BACK OF ALLEY EXTENSION, WHICHEVER COMES FIRST, SHALL BE THE TOP OF CURB ELEVATION AT SIDES OF APPROACH. FOR REHABILITATIONS, ELEVATION MAY BE REDUCED IF NECESSARY FOR DRAINAGE.
7. A 2" INVERT IS REQUIRED AT APPROACH CENTERLINE WHEN ALLEY DRAINS TOWARD STREET. WHEN ALLEY DRAINS AWAY FROM STREET, APPROACH IS FLAT.
8. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CITY OF MIDLAND STANDARD CONSTRUCTION SPECIFICATIONS.
9. OVER–EXCAVATION BELOW THE GRADE REQUIRED FOR THE APPROACH SHALL BE CORRECTED BY PLACING EXTRA CONCRETE AT THE TIME THE ALLEY APPROACH IS PLACED OR BY USE OF SHARP GRAINED CONCRETE SAND OR CRUSHER FINES (CHAT) OR BY PLACING AND COMPACTING CALICHE BASE.
10. IF REMOVING CURB & GUTTER TO THIS LINE WILL LEAVE A SECTION OF CURB & GUTTER LESS THAN 4' IN LENGTH, THE CURB AND GUTTER SHALL BE REMOVED TO THE NEAREST JOINT INSTEAD OF SAWING.



SECTION A–A

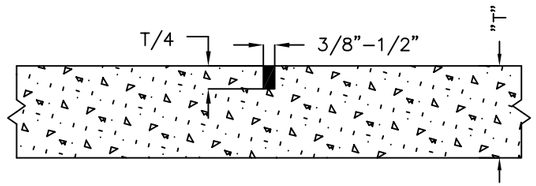
* OR MATCH ADJACENT CURB

Rev. No.	Date	By	Description

MIDLAND Engineering Services

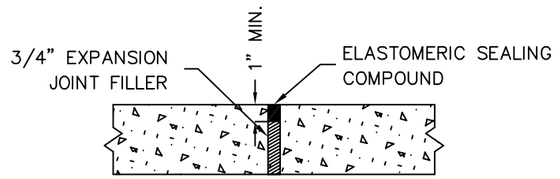
Engineering Services Division
Development Services Department
City Design and Construction Standards
Alley Approach

Dwg. Name	alley_app10.dwg	Dwg. No.	P–10
Drawn By	S. Swonke		
Checked By	R. Franks	Date	Sept. 2010
Approved By	R. Franks	Scale	N.T.S.



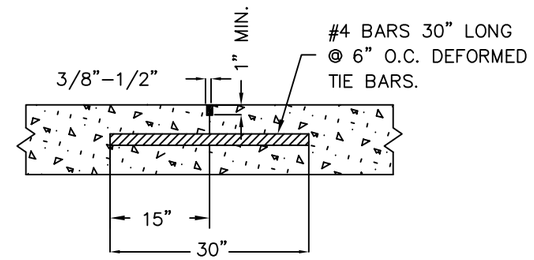
TRAVERSE CONTRACTION JOINT, SAWED AND FILLED WITH ELASTOMERIC SEALING COMPOUND, 15' SPACING FOR CENTER DRAIN AND CHANNEL FLUME. SPACING FOR OTHER CONCRETE WORK SHALL BE AS CALLED FOR IN THE SPECIFICATIONS AND NOTED ON THE PLANS AND DETAILS.

TYPE A



60' SPACING ON CHANNEL FLUME, 60' SPACING ON CENTER DRAIN, EXPANSION JOINT MATERIAL SHALL BE CUT TO CONFORM TO THE CROSS–SECTION OF THE STRUCTURE.SPACING SHALL BE AS CALLED FOR IN THE SPECIFICATIONS AND NOTED ON THE PLANS AND DETAILS.

DOWEL–LESS EXPANSION JOINT



TIED TRANSVERSE CONSTRUCTION JOINT, FOR USE WHEN NOT AT A JOINT LOCATION.SEALING CHANNEL SHALL BE A MINIMUM OF 1"IN DEPTH AND SHALL BE EDGED USING A TOOL WITH A 3/8" RADIUS.

TYPE E

Rev. No.	Date	By	Description

MIDLAND Engineering Services

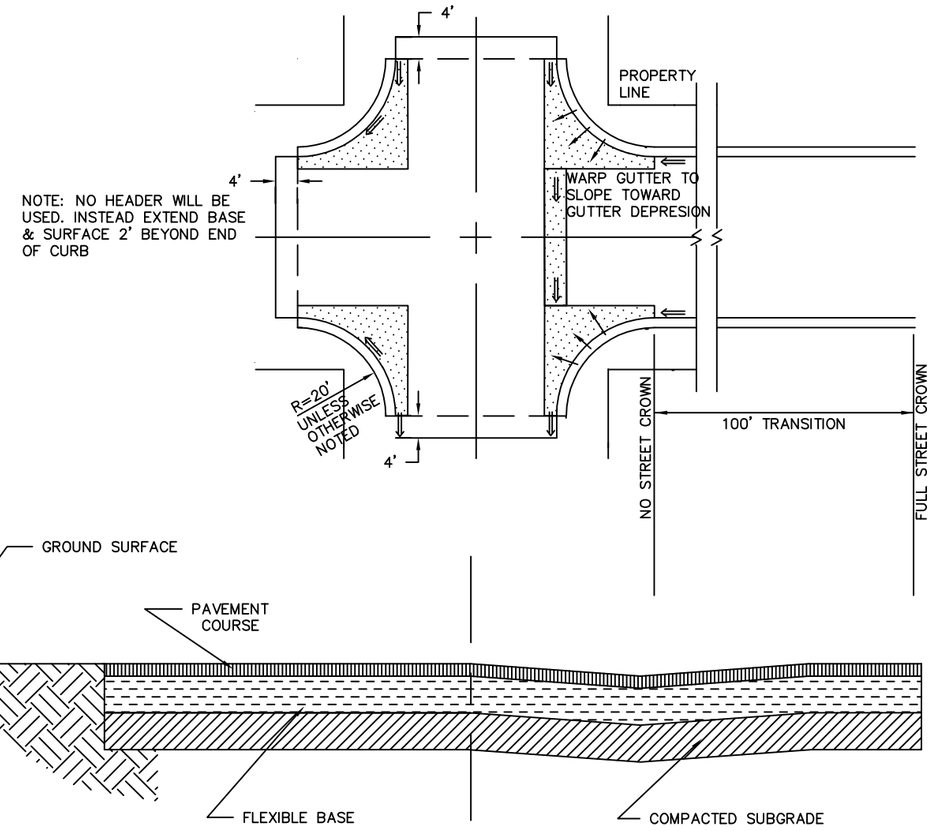
Engineering Services Division
Development Services Department
City Design and Construction Standards
Expansion Joints

Dwg. Name	expan_jt07	Dwg. No.	P–11
Drawn By	V.M. Lowe		
Checked By	R. Franks	Date	October 2007
Approved By	J.P. Robertson	Scale	N.T.S.

1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 P.S.I.

2. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CITY OF MIDLAND STANDARD SPECIFICATIONS.

3. USE CONCRETE FILLETS ON ALL STREET RADII, USE CONCRETE VALLEY GUTTERS WHEN THE CROSS GRADE IS LESS THAN 1%.



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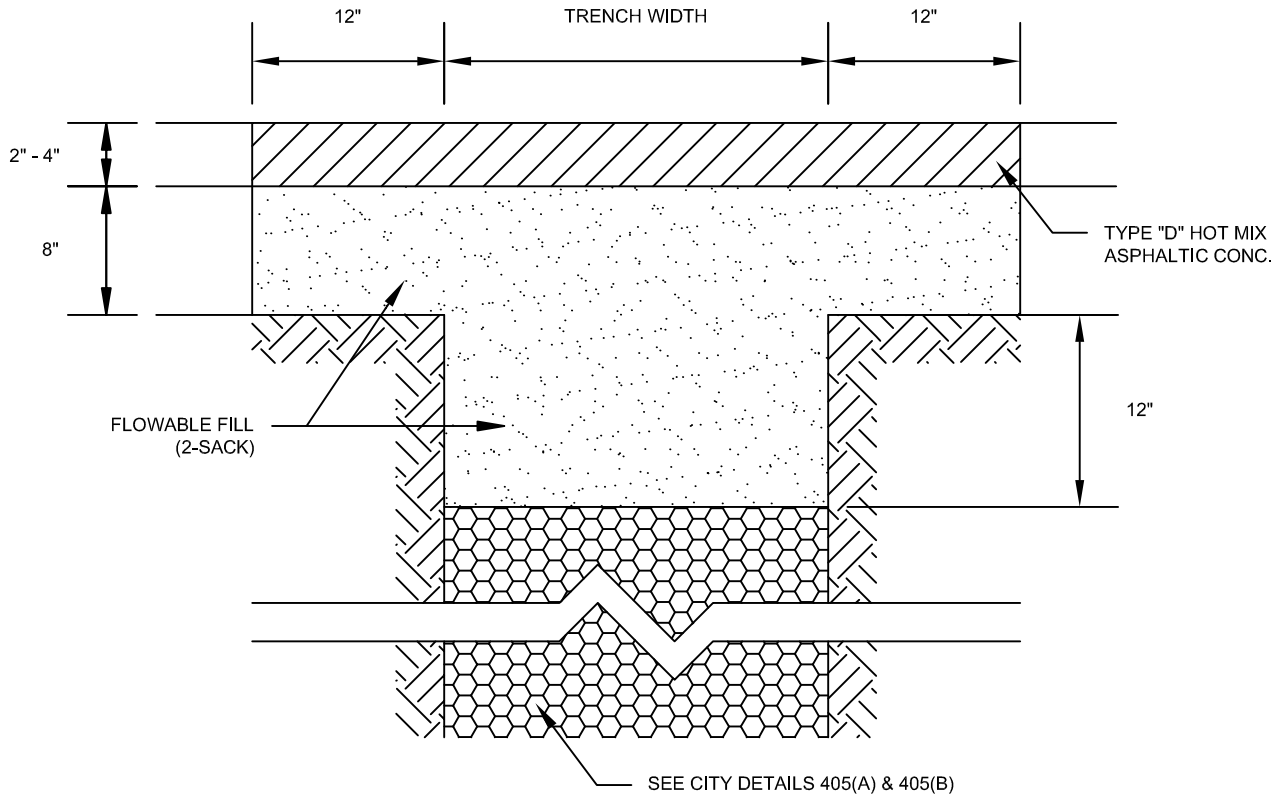
Rev. No.	Date	By	Description

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

PAVING DETAILS
INTERSECTION PAVEMENT

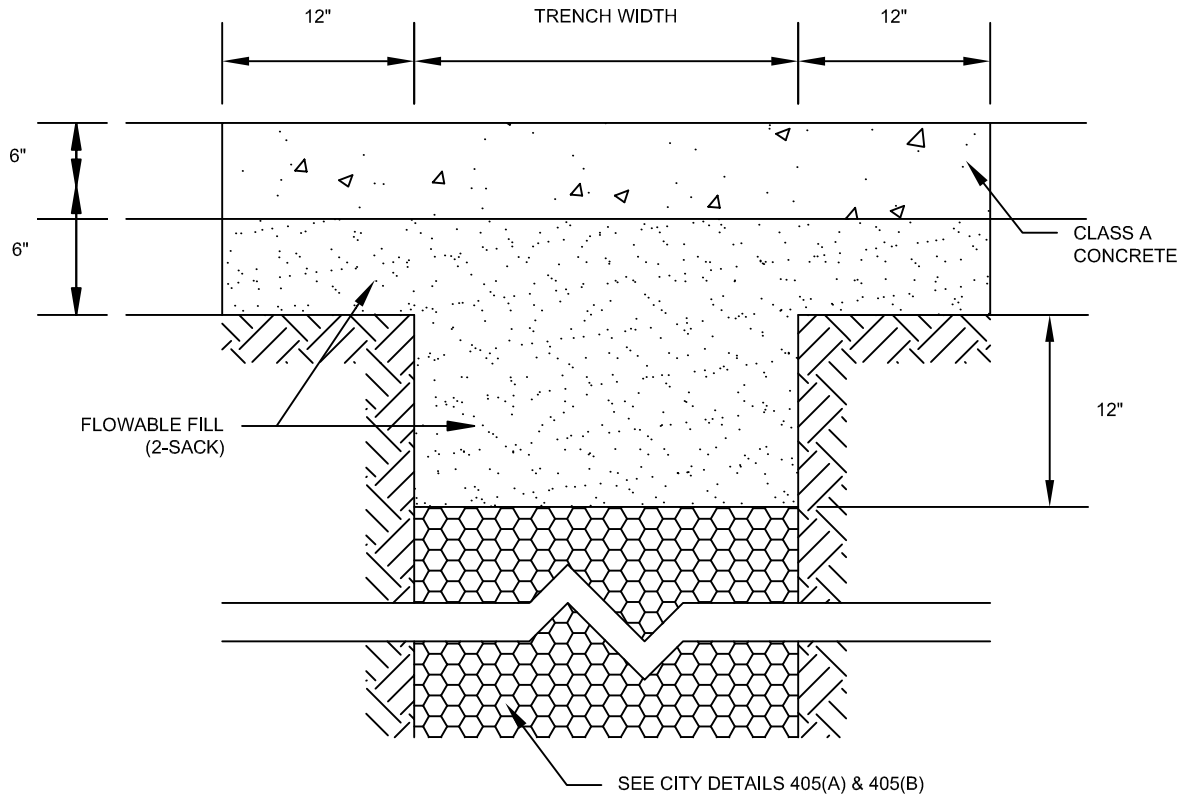
Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	P-12
Approved By	D. BEARD		



ASPHALT TRENCH PAVEMENT REPLACEMENT NOTES:

1. ASPHALT PAVEMENT THICKNESS SHOULD BE A MINIMUM OF 2" OR MATCH THE EXISTING ASPHALT THICKNESS IF IT IS GREATER THAN 2" THICK.
2. ALL FLOWABLE FILL (2-SACK, i.e. 188-LBS OF CEMENT PER CUBIC YARD) SHOULD BE PLACED AS A SINGLE CONTINUOUS POUR.
3. BOTH THE ASPHALT AND FLOWABLE FILL SHOULD EXTEND 12" BEYOND THE EDGE OF THE TRENCH ON BOTH SIDES.
4. SEE CITY OF MIDLAND TRENCHING & BEDDING DETAILS 405(A) AND 405(B) REGARDING TRENCH BACKFILL REQUIREMENTS BENEATH THE FLOWABLE FILL.

MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DESIGNED:	J. FERGUSON
	DATE:	07/14/2014	REVIEWED:	J. COHEN
	EFFECTIVE DATE:	07/31/2014	APPROVED:	J. COHEN
	ASPHALT TRENCH PAVEMENT REPLACEMENT		DETAIL:	229



ASPHALT TRENCH PAVEMENT REPLACEMENT NOTES:

1. CONCRETE SHALL BE CITY OF MIDLAND CLASS "A" AND SHALL HAVE A MINIMUM OF 5 SACKS (470-LBS) OF CEMENT PER CUBIC YARD AND A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3600 P.S.I.

1. CONCRETE PAVEMENT THICKNESS SHOULD BE A MINIMUM OF 6" OR MATCH THE EXISTING CONCRETE THICKNESS IF IT IS GREATER THAN 6" THICK.

2. ALL FLOWABLE FILL (2-SACK, i.e. 188-LBS OF CEMENT PER CUBIC YARD) SHOULD BE PLACED AS A SINGLE CONTINUOUS POUR.

3. BOTH THE CONCRETE AND FLOWABLE FILL SHOULD EXTEND 12" BEYOND THE EDGE OF THE TRENCH ON BOTH SIDES.

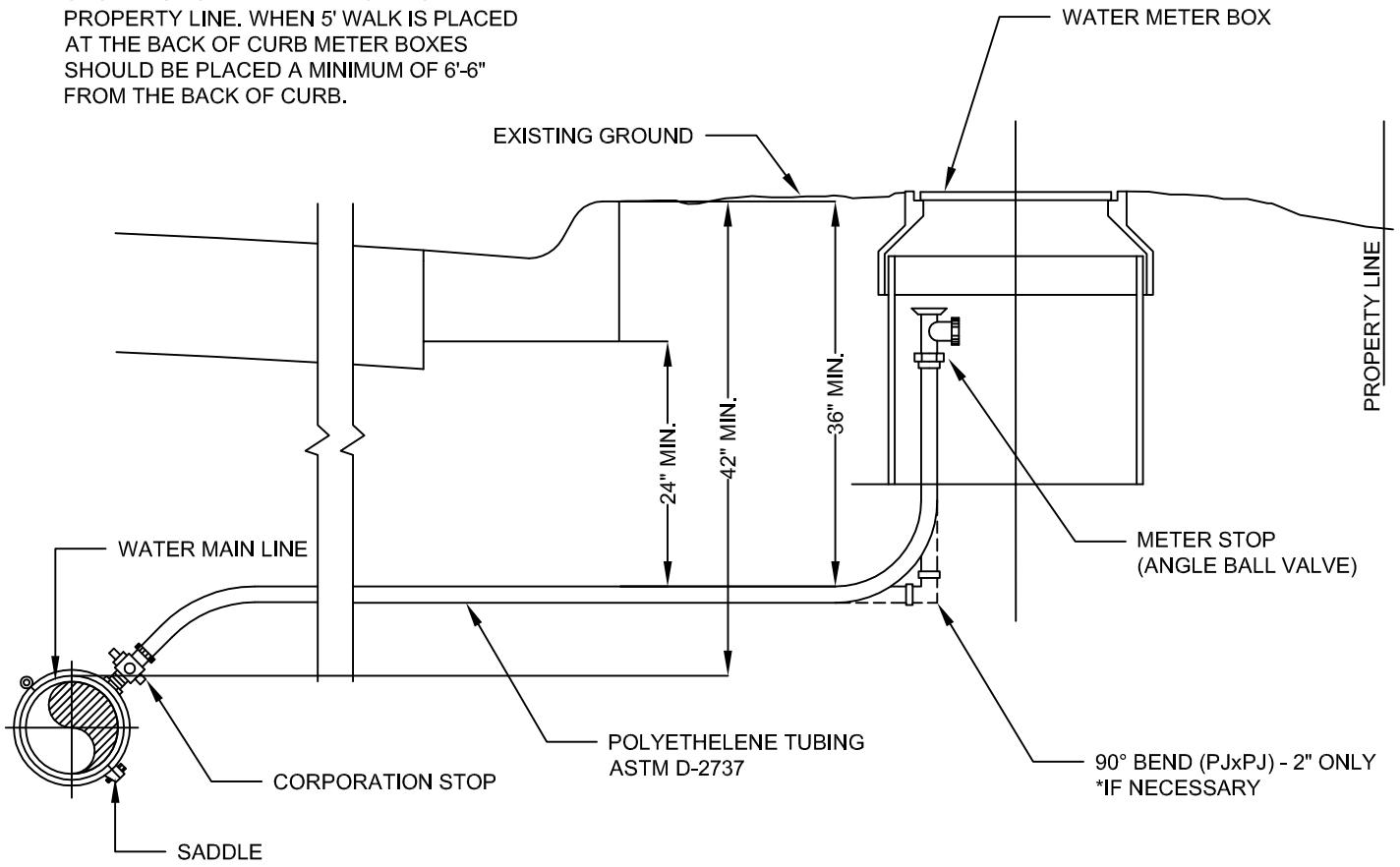
4. SEE CITY OF MIDLAND TRENCHING & BACKFILL DETAILS 405(A) AND 405(B) REGARDING TRENCH BACKFILL REQUIREMENTS BENEATH THE FLOWABLE FILL.

MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DESIGNED:	J. FERGUSON
	DATE:	07/14/2014	REVIEWED:	J. COHEN
	EFFECTIVE DATE:	07/31/2014	APPROVED:	J. COHEN
	CONCRETE TRENCH PAVEMENT REPLACEMENT		DETAIL:	230

NOTE:

1. ALL WATER SERVICES TO BE 1" EXCEPT WHERE LARGER SIZES ARE CALLED FOR ON THE PLANS.

2. THE DISTANCE FROM PROPERTY LINE SHOWN IS FOR 4' WALK PLACE 1' OFF THE PROPERTY LINE. WHEN 5' WALK IS PLACED AT THE BACK OF CURB METER BOXES SHOULD BE PLACED A MINIMUM OF 6'-6" FROM THE BACK OF CURB.



3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	09/17/2012	CHECKED:	D. BEARD
1			EFFECTIVE DATE:	03/15/2013	APPROVED:	D. BEARD
REV. NO.	DATE		WATER METER SERVICE CONNECTION		DETAIL:	402(A)

APPROVED COMPONENT LIST

1" WATER METER SERVICE	2" WATER METER SERVICE
SADDLE 1. FORD HINGED S90 SADDLE 2. MUELLER S-13000 SADDLE 3. A.Y. MCDONALD SERIES 3895 4. OR APPROVED EQUAL	SADDLE 1. FORD HINGED S90 SADDLE 2. MUELLER H-13000 SADDLE 3. A.Y. MCDONALD SERIES 3895 4. OR APPROVED EQUAL
CORPORATION STOP 1. FORD FB1000-4 2. MUELLER P-25008 3. A.Y. MCDONALD SERIES 4701B-22 1 4. OR APPROVED EQUAL	CORPORATION STOP 1. FORD FB1000-7 2. MUELLER P-25008 3. A.Y. MCDONALD SERIES 4701B-22 2 4. OR APPROVED EQUAL
CURB STOP METER VALVE 1. FORD BA43-444W 2. MUELLER P-25172 3. A.Y. MCDONALD SERIES 4602B-22 1 4. OR APPROVED EQUAL	CURB STOP METER VALVE 1. FORD BFA43-777W 2. MUELLER P-25172 3. A.Y. MCDONALD SERIES 4602B-22 2 4. OR APPROVED EQUAL
WATER METER BOX 1. EAST JORDAN 32197099A02 2. OR APPROVED EQUAL	WATER METER BOX 1. EAST JORDAN 32244000A01 2. OR APPROVED EQUAL
POLYETHELENE TUBING 1. ASTM D-2737	POLYETHELENE TUBING 1. ASTM D-2737

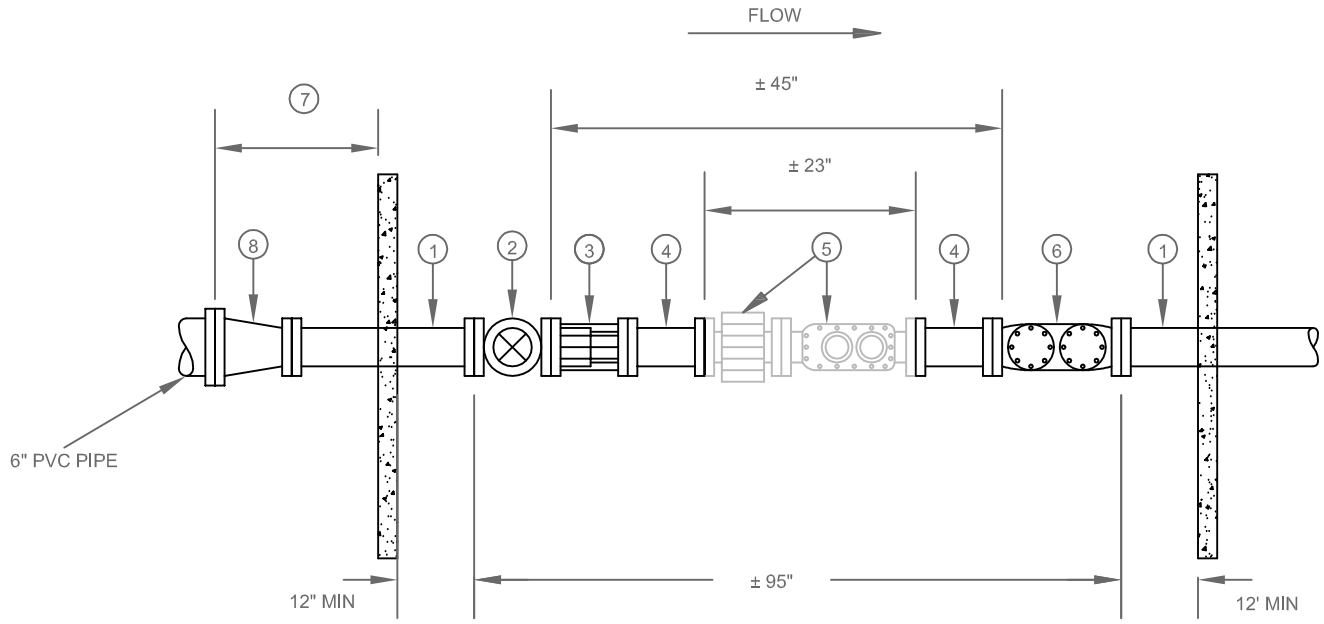
NOTE: ALL COMPONENTS OF ANY WATER METER SERVICE LINE MUST COME FROM THE SAME BRAND WHENEVER POSSIBLE.

SMITH-BLAIR 313 SADDLES OR APPROVED EQUAL SHALL BE USED FOR DUCTILE IRON PIPE.

REV. NO.	DATE					
3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	09/17/2012	CHECKED:	D. BEARD
1			EFFECTIVE DATE:	03/15/2013	APPROVED:	D. BEARD
		WATER METER SERVICE CONNECTION			DETAIL:	402(B)

1. ALL 3" PIPE AND FITTINGS IN VAULT TO BE AWWA C151 DUCTILE IRON PIPE, FLANGED
2. 3" GATE VALVE, NRS WITH HAND WHEEL, FL
3. 3" FLANGE COUPLING ADAPTER. ONE (1) REQ'D; MAY USE SECOND IN MIRRORED POSITION ON DOWNSTREAM SIDE OF METER ASSEMBLY.
4. 8" SPOOL, FLANGE-END OR PLAIN-END. REF #4.
5. 3" NEPTUNE TRU/FLO COMPOUND METER AND STRAINER ASSEMBLY. CITY TO PROVIDE AND INSTALL, AT OWNER'S EXPENSE.
6. 3" DOUBLE CHECK VALVE ASSEMBLY, FL
7. DUCTILE IRON PIPE, MINIMUM 5' FROM VAULT WALL.
8. 6" X 3" REDUCER, MJ X FL

VAULT SHALL BE PRE-CAST OF CAST-IN-PLACE CONCRETE. MINIMUM 6'-0" W X 10'-0" L X 5'-0" H INSIDE DIMENSIONS. VAULT SHALL BE BOTTOMLESS, WITH WIDENED WALL BOTTOMS OR SEPARATE FOOTINGS; PROVIDE 4" CRUSHED ROCK BEDDING. PROVIDE CONCRETE SUPPORTS UNDER METER ASSEMBLY AT TEES AND METER, AND AT MIDSPANS OR BYPASS. METER ASSEMBLY SHALL BE SET A MINIMUM OF 24" ABOVE TOP OF CRUSHED ROCK BEDDING. MAINTAIN 6" CLEARANCE BETWEEN PIPING AND FITTINGS AND CONCRETE VAULT WALLS.

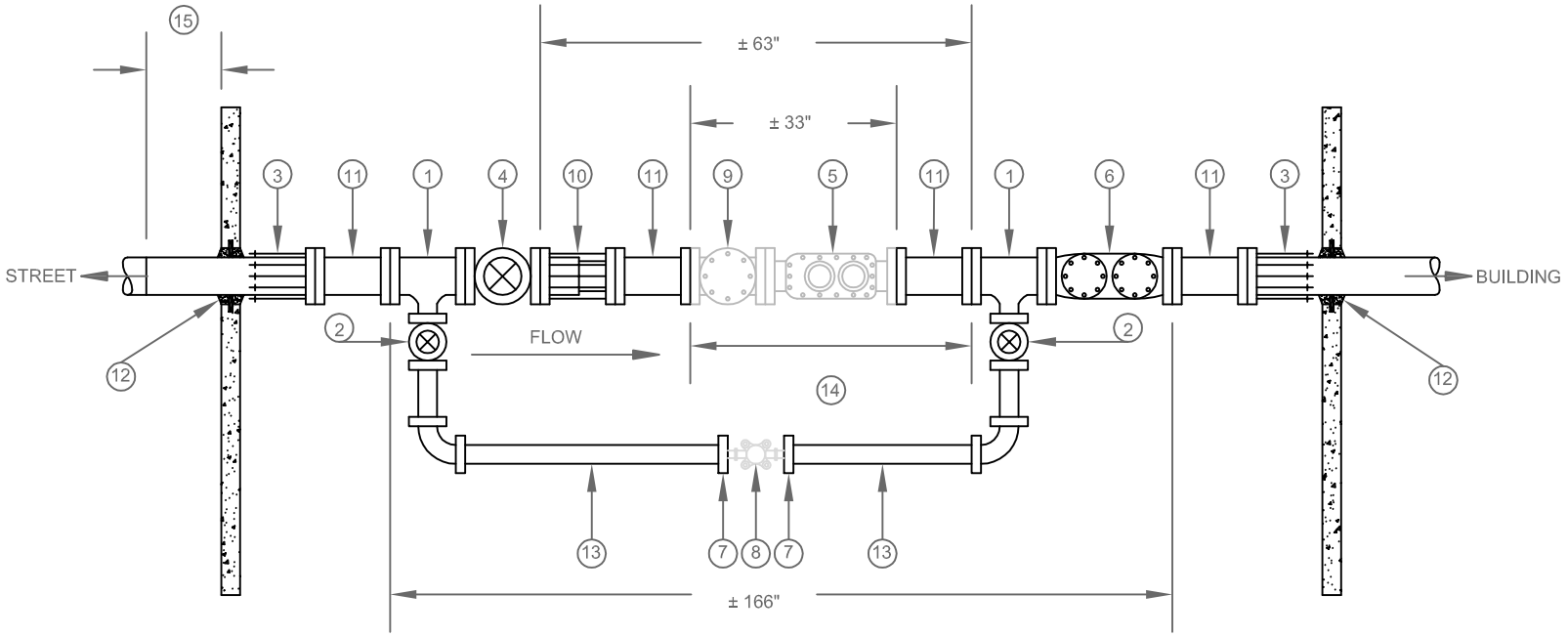


* A PRE-ASSEMBLED VAULT MATCHING OR EXCEEDING THIS DETAIL IS ACCEPTABLE. GALVANIZED ALL-THREAD RETAINER RODS (TYP) AND A BLANK SPOOL FOR SHIPPING MUST BE PROVIDED BY THE CONTRACTOR FOR EACH PRE-ASSEMBLED VAULT.

3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	04/03/2013	CHECKED:	J. COHEN
1			EFFECTIVE DATE:	06/05/2013	APPROVED:	D. BEARD
REV. NO.	DATE		3" METER ASSEMBLY		DETAIL:	418

1. 6" X 4" D.I. TEE, FL
2. 4" GATE VALVE, NRS WITH HAND WHEEL, FL
3. ADAPTER, FL X MJ
4. 6" GATE VALVE, NRS WITH HAND WHEEL, FL
5. 6" COMPOUND METER. CITY TO PROVIDE AND INSTALL, AT OWNER'S EXPENSE
6. 6" DOUBLE CHECK VALVE ASSEMBLY, FL
7. 4" D.I. BLIND FLANGE WITH 1" OR 2" TAP AND BRASS NIPPLE
8. 1" OR 2" DISK METER. CITY TO PROVIDE AND INSTALL AT OWNER'S EXPENSE.
9. STRAINER, SAME MFGR AS COMPOUND METER. CITY TO PROVIDE AND INSTALL AT OWNER'S EXPENSE.
10. ROMAC INDUSTRIES INC., STYLE DJ400 DISMANTLING JOINT; OR EQUAL
11. ALL 6" PIPE IN VAULT TO BE AWWA C151 DUCTILE IRON PIPE, FLANGED
12. LINK-SEAL MODULAR SEAL OR FERNCO CONCRETE MANHOLE ADAPTER, OR EQUAL; WITH NON-SHRINK GROUT
13. ALL 4" PIPE AND FITTINGS TO BE AWWA C151 DUCTILE IRON PIPE, FLANGED
14. UNOBSTRUCTED LENGTH UPSTREAM AND DOWNSTREAM OF METER PER METER MFGR'S RECOMMENDED INSTRUCTIONS.
15. DUCTILE IRON PIPE, MINIMUM 5' FROM VAULT WALL.

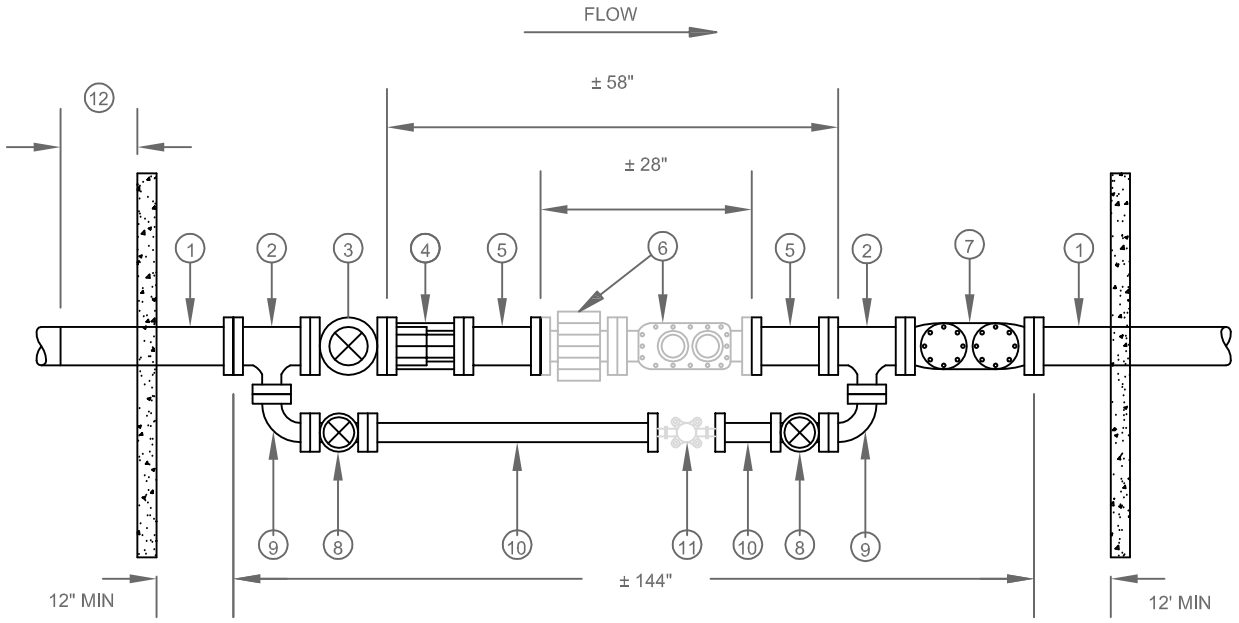
VAULT SHALL BE PRE-CAST OF CAST-IN-PLACE CONCRETE. MINIMUM 8'-0" W X 16'-0" L X 5'-0" H INSIDE DIMENSIONS. VAULT SHALL BE BOTTOMLESS, WITH WIDENED WALL BOTTOMS OR SEPARATE FOOTINGS; PROVIDE 4" CRUSHED ROCK BEDDING. PROVIDE CONCRETE SUPPORTS UNDER METER ASSEMBLY AT TEES AND METER, AND AT MIDSPANS OR BYPASS. METER ASSEMBLY SHALL BE SET A MINIMUM OF 24" ABOVE TOP OF CRUSHED ROCK BEDDING. MAINTAIN 6" CLEARANCE BETWEEN PIPING AND FITTINGS AND CONCRETE VAULT WALLS.



3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	01/09/2013	CHECKED:	J. COHEN
1			EFFECTIVE DATE:	03/15/2013	APPROVED:	D. BEARD
REV. NO.	DATE		6" METER ASSEMBLY AND RE-ROUTE		DETAIL:	417

1. ALL 4" PIPE AND FITTINGS IN VAULT TO BE AWWA C151 DUCTILE IRON PIPE, FLANGED
2. 4" X 4" D.I. TEE, FL
3. 4" GATE VALVE, NRS WITH HAND WHEEL, FL
4. 4" FLANGE COUPLING ADAPTER. ONE (1) REQ'D; MAY USE SECOND IN MIRRORED POSITION ON DOWNSTREAM SIDE OF METER ASSEMBLY.
5. 12" SPOOL, FLANGE-END OR PLAIN-END. REF #4.
6. 4" NEPTUNE TRU/FLO COMPOUND METER AND STRAINER ASSEMBLY. CITY TO PROVIDE AND INSTALL, AT OWNER'S EXPENSE. CONTRACTOR TO PROVIDE BLANK SPOOL FOR SHIPPING.
7. 4" DOUBLE CHECK VALVE ASSEMBLY, FL
8. 4" GATE VALVE, NRS WITH HAND WHEEL, FL
9. 4" D.I. 90° BEND, FL
10. 4" BYPASS. AWWA C151 DUCTILE IRON PIPE, FLANGED.
11. 1" OR 2" DISK METER. CITY TO PROVIDE AND INSTALL AT OWNER'S EXPENSE. CONTRACTOR TO PROVIDE BLANK SPOOL FOR SHIPPING, AND AT JOB-SITE TO INSTALL BLIND FLANGE WITH 1" OR 2" TAP AND BRASS NIPPLE ON EACH SIDE OF METER.
12. DUCTILE IRON PIPE, MINIMUM 5' FROM VAULT WALL.

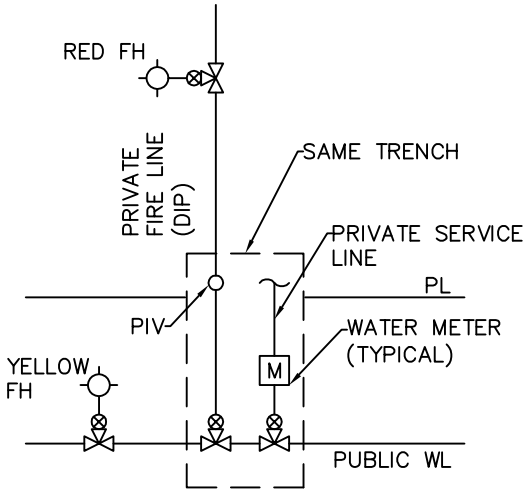
VAULT SHALL BE PRE-CAST OF CAST-IN-PLACE CONCRETE. MINIMUM 6'-0" W X 14'-0" L X 5'-0" H INSIDE DIMENSIONS. VAULT SHALL BE BOTTOMLESS, WITH WIDENED WALL BOTTOMS OR SEPARATE FOOTINGS; PROVIDE 4" CRUSHED ROCK BEDDING. PROVIDE CONCRETE SUPPORTS UNDER METER ASSEMBLY AT TEES AND METER, AND AT MIDSPANS OR BYPASS. METER ASSEMBLY SHALL BE SET A MINIMUM OF 24" ABOVE TOP OF CRUSHED ROCK BEDDING. MAINTAIN 6" CLEARANCE BETWEEN PIPING AND FITTINGS AND CONCRETE VAULT WALLS.



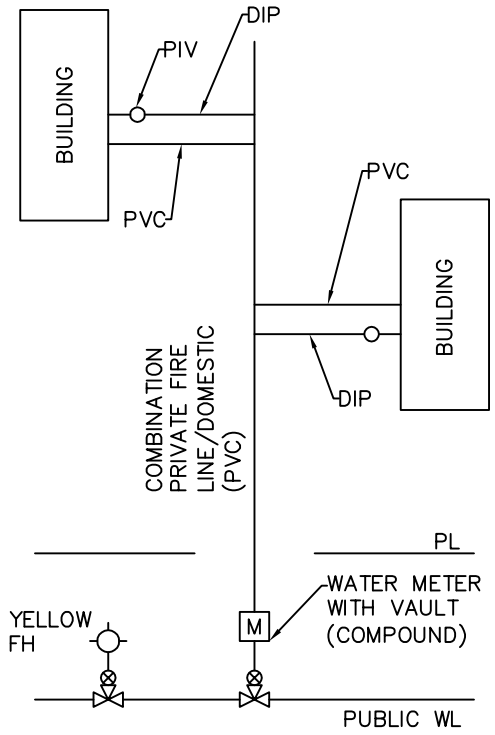
3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	01/09/2013	CHECKED:	J. COHEN
1			EFFECTIVE DATE:	03/15/2013	APPROVED:	D. BEARD
REV. NO.	DATE		4" METER ASSEMBLY AND RE-ROUTE		DETAIL:	416

FIRE LINES SHALL BE DUCTILE IRON AND A MINIMUM OF 4" IN DIAMETER.

A 6" TAP SHALL BE USED FOR ALL COMMERCIAL PROPERTIES WITHIN THE PUBLIC RIGHT OF WAY.

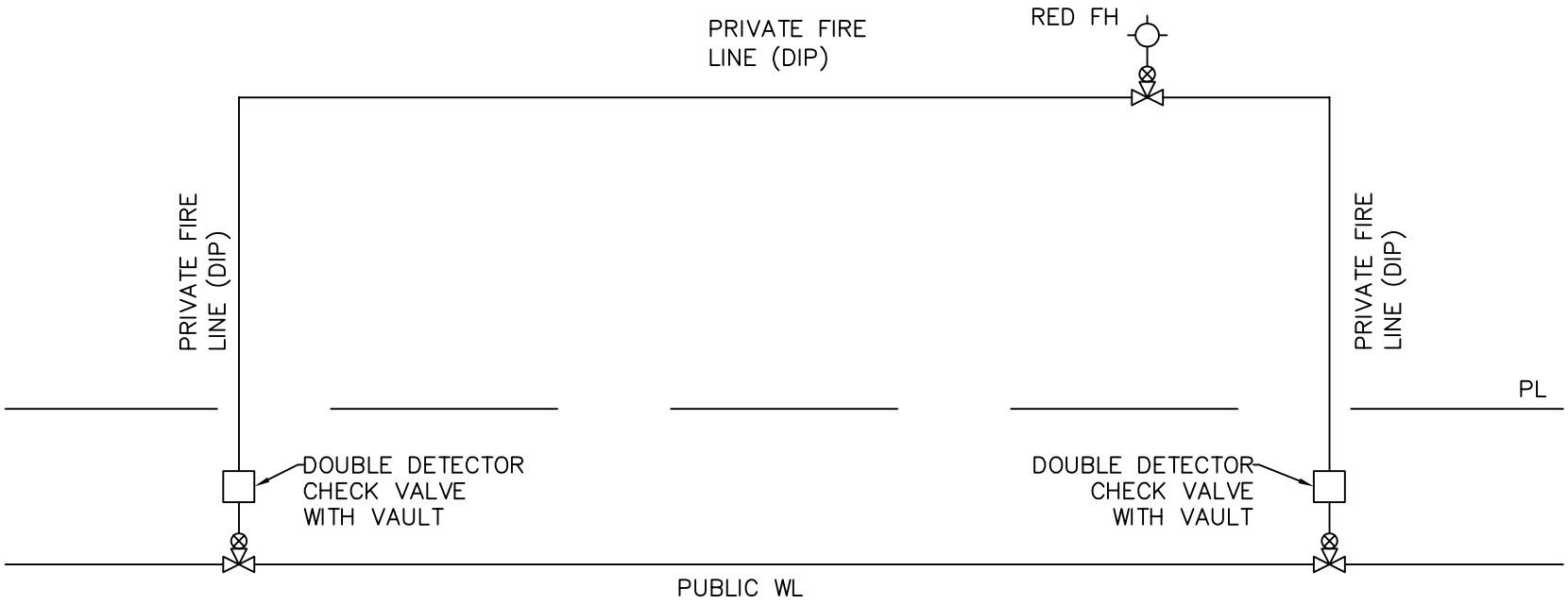


PRIVATE FIRE LINE
(STANDARD)



PRIVATE FIRE LINE
(COMBINATION
FIRE/DOMESTIC)

3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	09/17/2012	CHECKED:	D. BEARD
1			EFFECTIVE DATE:	03/15/2013	APPROVED:	D. BEARD
REV. NO.	DATE		PRIVATE FIRE LINE		DETAIL:	413(A)



FIRE LINES SHALL BE DUCTILE IRON AND A MINIMUM OF 4" IN DIAMETER.

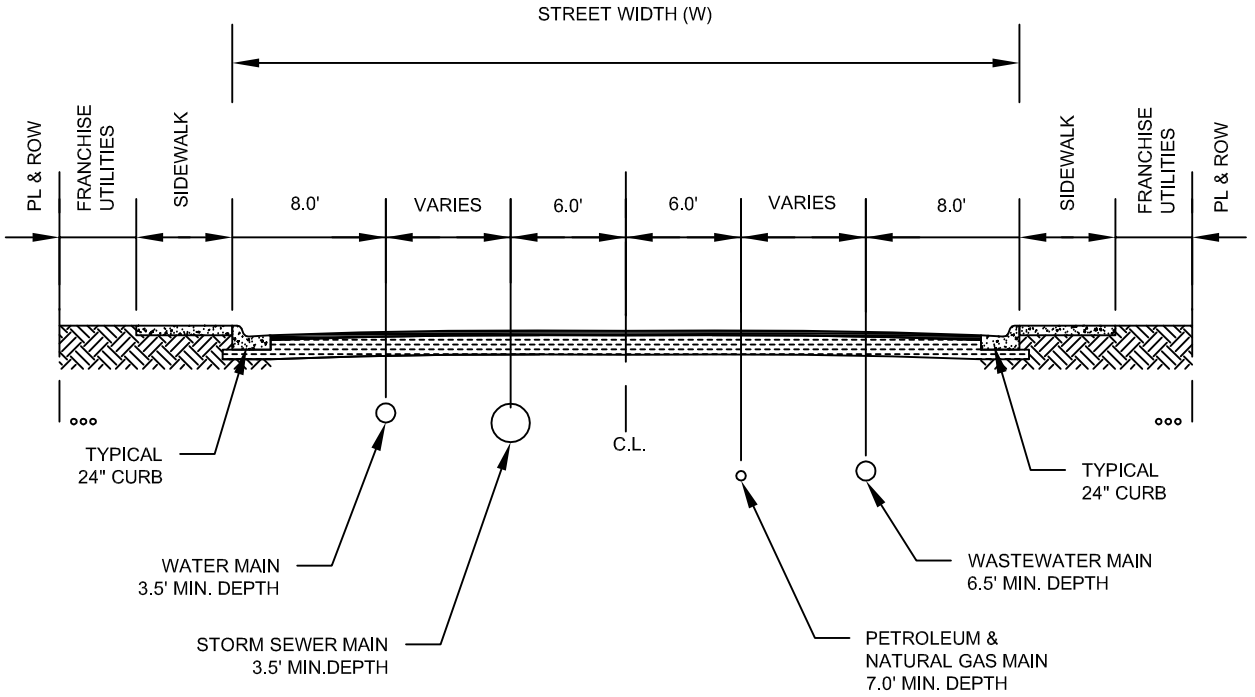
A 6" TAP SHALL BE USED FOR ALL COMMERCIAL PROPERTIES WITHIN THE PUBLIC RIGHT OF WAY.

PRIVATE FIRE LINE (LOOPED)

3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	09/17/2012	CHECKED:	D. BEARD
1			EFFECTIVE DATE:	03/15/2013	APPROVED:	D. BEARD
REV. NO.	DATE		PRIVATE FIRE LINE		DETAIL:	413(B)

NOTES:

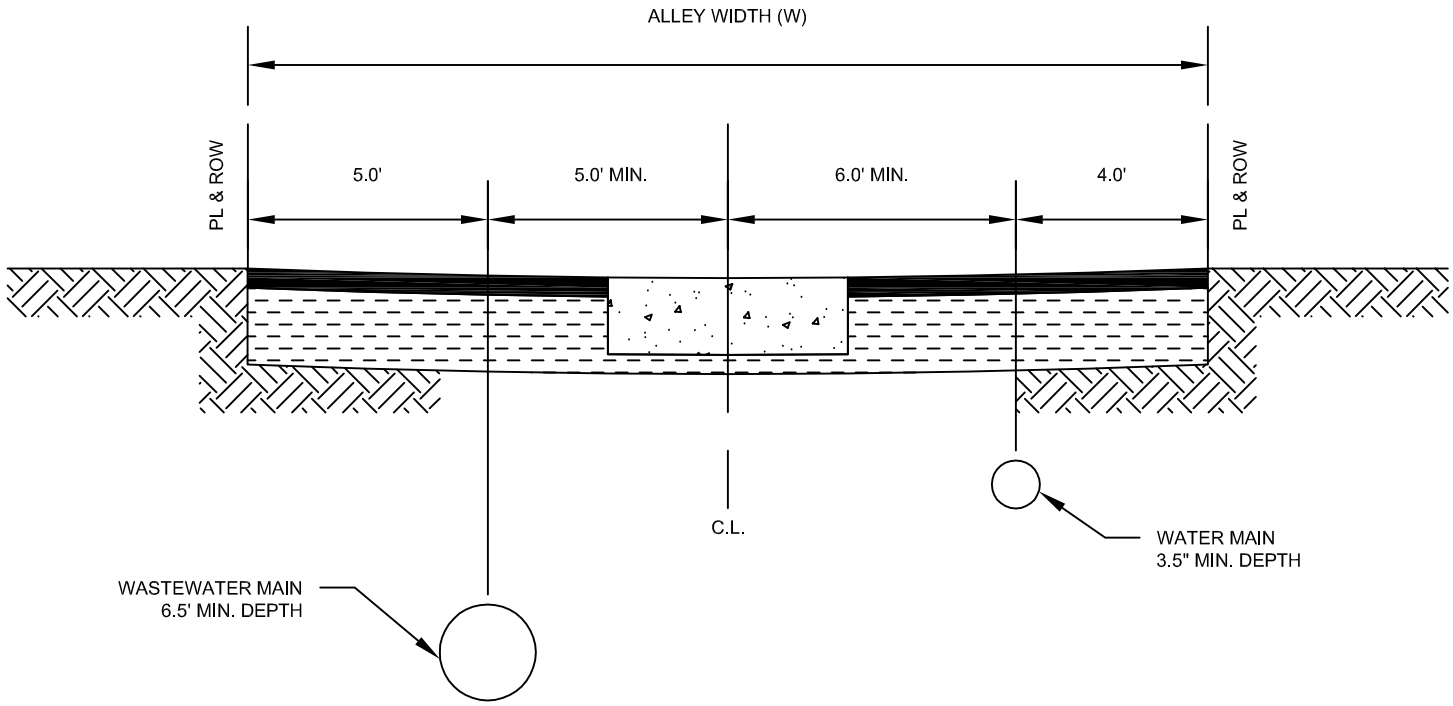
1. SEWER MAIN LOCATION APPLIES ONLY IF A DEVELOPMENT IS DESIGNED WITHOUT ALLEYS. IF A SITE INCLUDES ALLEYS, OR IS ADJACENT TO EXISTING ALLEYS, THEN THE SEWER MAIN SHALL BE LOCATED IN THE ALLEY AND NOT THE STREET.
2. ALL DEPTHS ARE FROM THE GUTTER INVERT TO THE TOP OF PIPE.
3. STREET WIDTH VARIES DEPENDING ON THE SIZE AND TYPE OF STREET TO BE CONSTRUCTED.



SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
DATE:	05/20/2013	CHECKED:	J. COHEN
EFFECTIVE DATE:	07/22/2013	APPROVED:	J. COHEN
STANDARD UTILITY MAIN STREET SPACING & DEPTH		DETAIL:	414(A)

NOTES:

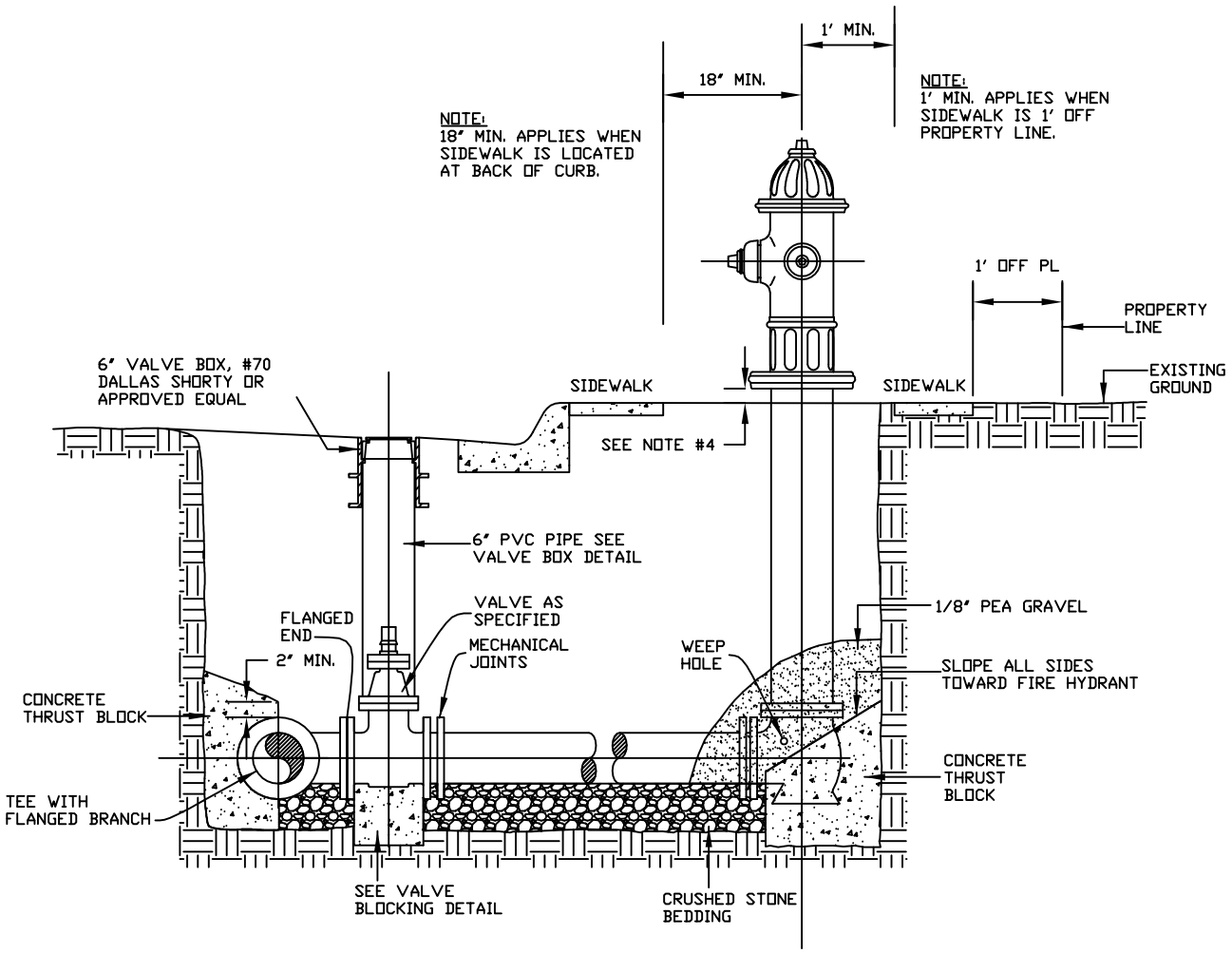
1. WATER MAIN LOCATION APPLIES FOR EXCEPTIONS ONLY. THE STANDARD CITY REQUIREMENT REMAINS LOCATING WATER MAINS IN STREETS.
2. ALL DEPTHS ARE FROM THE ALLEY INVERT TO THE TOP OF PIPE.
3. WHEN NO WATER MAIN IS LOCATED IN THE ALLEY THE WASTEWATER MAIN MINIMUM COVER = 2.5'.
4. ALLEY WIDTH VARIES DEPENDING ON THE SIZE AND TYPE OF ALLEY TO BE CONSTRUCTED.



SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
DATE:	07/16/2014	CHECKED:	J. COHEN
EFFECTIVE DATE:	07/31/2014	APPROVED:	J. COHEN
STANDARD UTILITY MAIN ALLEY SPACING & DEPTH		DETAIL:	414(B)

NOTE:

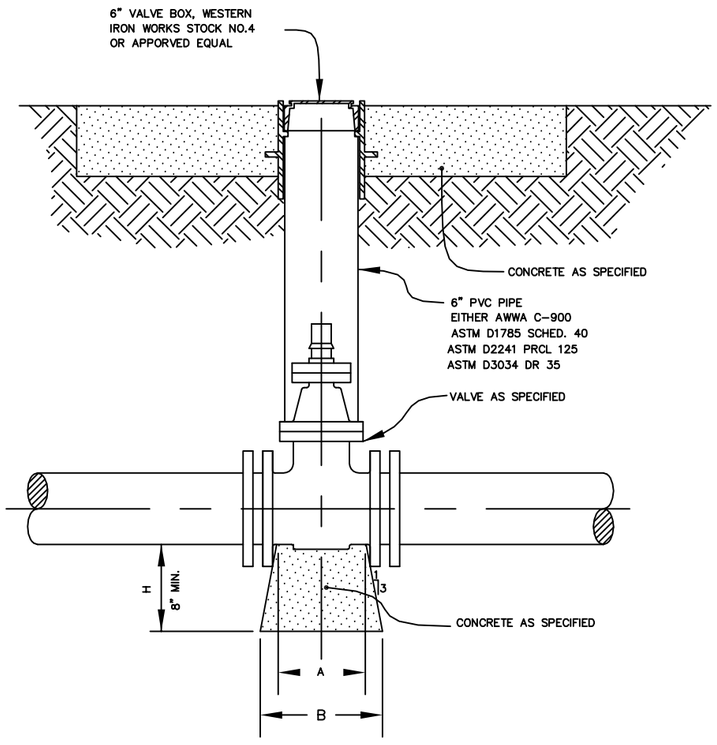
1. FIRE HYDRANTS AT STREET INTERSECTIONS ARE TO BE LOCATED AT THE NORTH END OF THE NORTHWEST RETURN RADIUS UNLESS NOTED OTHERWISE ON THE PLANS.
2. ALL VALVE BOXES ARE TO BE SET IN A CONCRETE COLLAR WHEN PLACED AT THEIR FINAL GRADE. SEE VALVE BOX INSTALLATION DETAIL DRAWING.
3. LEAVE VALVE BOX 6" TO 10" ABOVE GRADE FOR NEW SUBDIVISION AND OTHER STREETS AND ALLEYS SCHEDULED FOR IMMEDIATE PAVING UNTIL STREET WORK IS DONE. THE PAVING CONTRACTOR SHALL ADJUST THE VALVE BOX TO FINISHED GRADE BEFORE PLACING LAST COURSE OF HMAC SURFACE.
4. FRANGIBLE FLANGE OF FIRE HYDRANT SHALL BE SET A MINIMUM OF 2" AND A MAXIMUM OF 6" ABOVE SIDEWALK ELEVATION.
5. ON STREETS WHERE NO SIDEWALK IS TO BE CONSTRUCTED, SET CENTERLINE OF FIRE-HYDRANT AT 3' BACK OF CURB.
6. FIRE HYDRANT CUT-OFF VALVE SHALL BE PLACES A MINIMUM OF 3' FROM THE CENTER LINE OF THE FIRE HYDRANT. THIS MAY REQUIRE THE USE OF A 90° BEND TO OFFSET THE FIRE HYDRANT.
7. CONCRETE THRUST BLOCKS SHALL BE SHAPED SO THAT NO WATER WILL BE DRAINED BEHIND THE THRUST BLOCK.

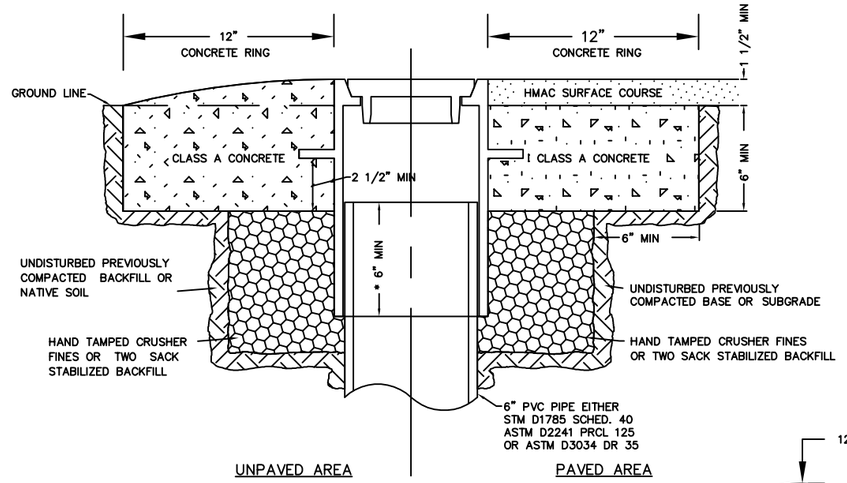


3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	10/24/2012	CHECKED:	D. BEARD
1			EFFECTIVE DATE:	03/15/2013	APPROVED:	D. BEARD
REV. NO.	DATE		FIRE HYDRANT		DETAIL:	403

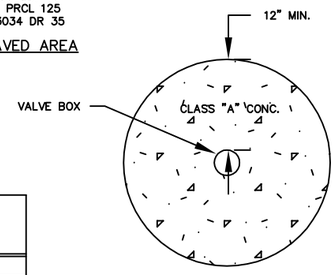
NOTE:

SETTING VALVE BOX TO GRADE MAY REQUIRE ADDING PVC PIPE. IF ADDITIONAL PIPE IS REQUIRED, USE BELL SECTION WITH GASKET AND SET BELL DOWN OVER EXISTING PIPE RISER. A GASKETTED SELF CENTERING COLLAR MAY BE USED IN LIEU OF THE BELL SECTION.





DETAIL FOR SETTING VALVE BOX



VALVE BLOCKING CHART

PIPE SIZE	①VALVE TYPE	A	③B	②C	H
4"	RSG	5.00"	0'-10.50"	1'-4"	8
6"	RSG	6.50"	1'-0"	1'-6"	8
8"	RSG	6.50"	1'-0"	1'-8.50"	8
10"	RSG	8.00	1'-1"	1'-10"	8
12"	RSG	8.50"	1'-2"	2'-0"	8
④16"	BF	5.90"	0'-11.50"	2'-6"	8

NOTE:

ALL THRUST BLOCKING SHALL BE CLASS "A" CONCRETE AND SHALL BE PLACE AGAINST UNDISTURBED EARTH.
VALVE SHALL BE POLY WRAPPED BEFORE PLACING BLOCKING

① RSG – RESILIENT SEAT GATE VAVE
BF – RESILIENT SEAT BUTTERFLY VALVE
② C – DEPTH OF BEARING FOR VALVE BLOCKING = NOMINAL TRENCH WIDTH
③ BATTER FOR VALVE BLOCK IS 1:3
④ BLOCKING FOR VALVES LARGER THAN 16" SHALL BE AS SHOWN ON THE PLANS

Rev. No.	Date	By	Description

MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Valve & Valve Box Installation

Dwg. Name	valv_bx07
Drawn By	V.M. Lowe
Checked By	R. Franks
Approved By	J.P. Robertson

Dwg. No.	W-4
Date	October 2007
Scale	N.T.S.

BUTTERFLY VALVE

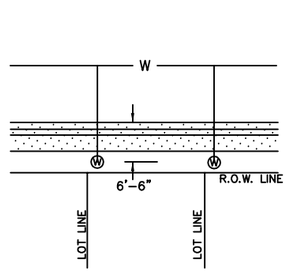
GATE VALVE

TEE

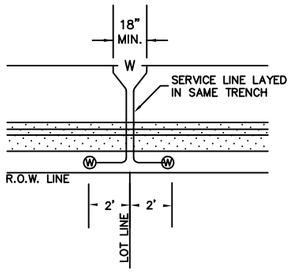
CROSS

FIRE HYDRANT

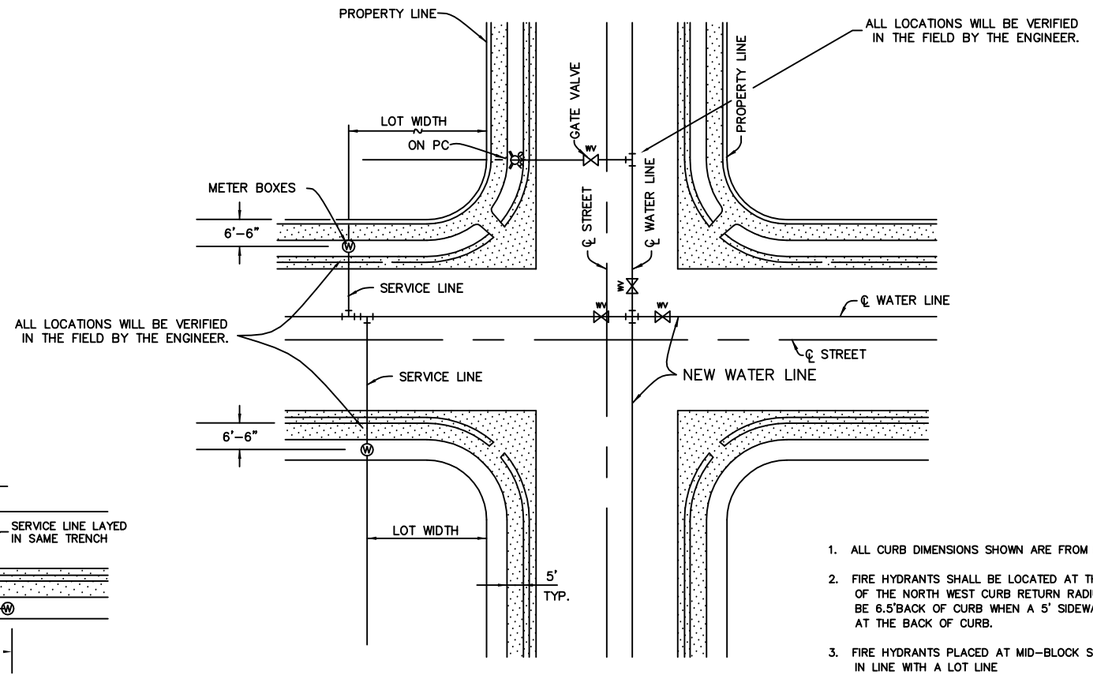
METER BOX



DETAIL FOR PLACING SERVICE LINE AT LOT LINE



DETAIL FOR PLACING SERVICE LINES IN THE SAME TRENCH



1. ALL CURB DIMENSIONS SHOWN ARE FROM BACK OF CURB
2. FIRE HYDRANTS SHALL BE LOCATED AT THE NORTH END OF THE NORTH WEST CURB RETURN RADIUS AND SHALL BE 6.5'BACK OF CURB WHEN A 5' SIDEWALK IS PLACED AT THE BACK OF CURB.
3. FIRE HYDRANTS PLACED AT MID-BLOCK SHALL BE PLACED IN LINE WITH A LOT LINE
4. TWO SERVICE LINES MAY BE PLACED IN THE SAME TRENCH. EACH TAP MUST BE SEPARATED AND HAVE BOTH A CORPERATION STOP AND A METER STOP. "BULLHEAD" TAPS ARE NOT PERMITTED.

Rev. No.	Date	By	Description

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

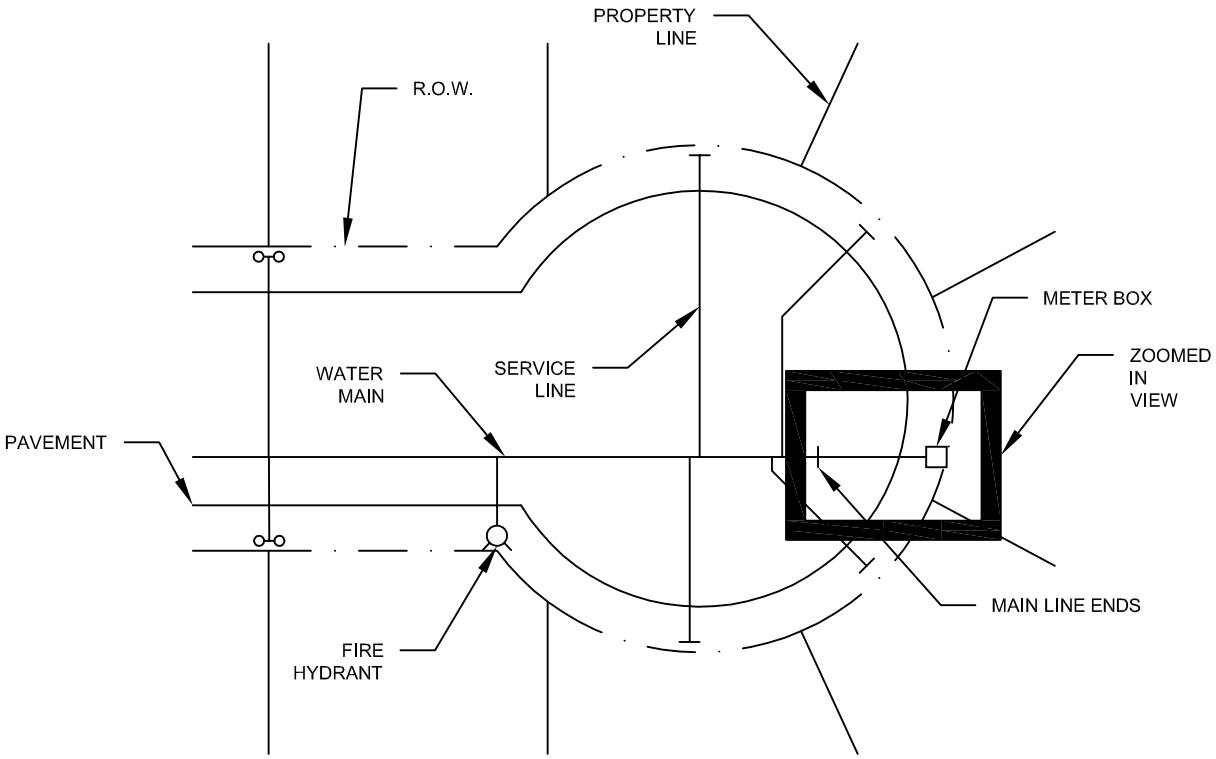
WATER DETAILS
UTILITY INTERSECTION LAYOUT

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	W-5
Approved By	D. BEARD		

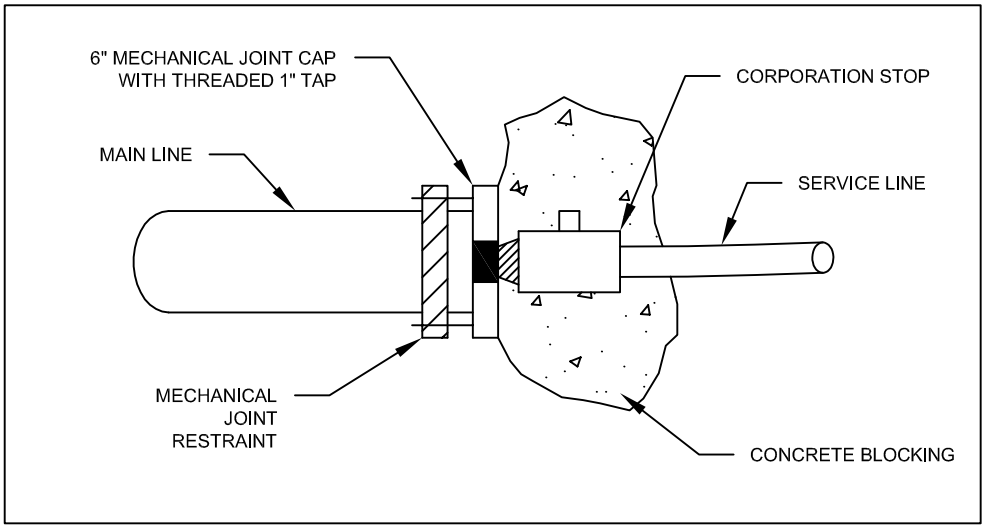
File: H:\detail\Details 2011\021util_int11.dwg

NOTES:

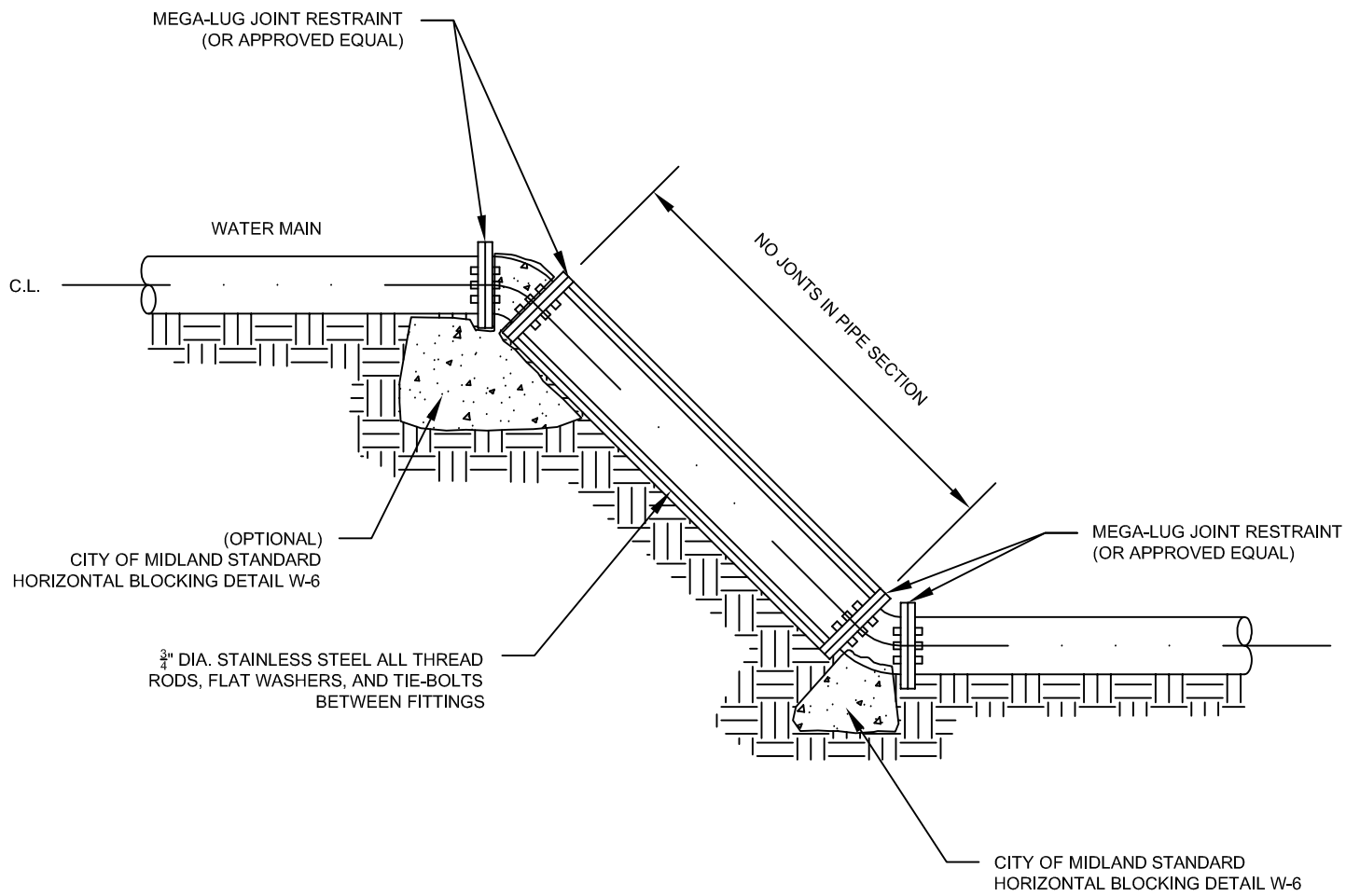
1. FIRE HYDRANTS SHALL BE LOCATED AT THE END OF RADIUS OF THE CUL-DE-SAC.
2. WATER MAIN EXTENDED PAST CUL-DE-SAC FIRE HYDRANT SHALL BE 6-INCH IN DIAMETER WITH TAPPED CAP FOR END OF MAIN SERVICE.



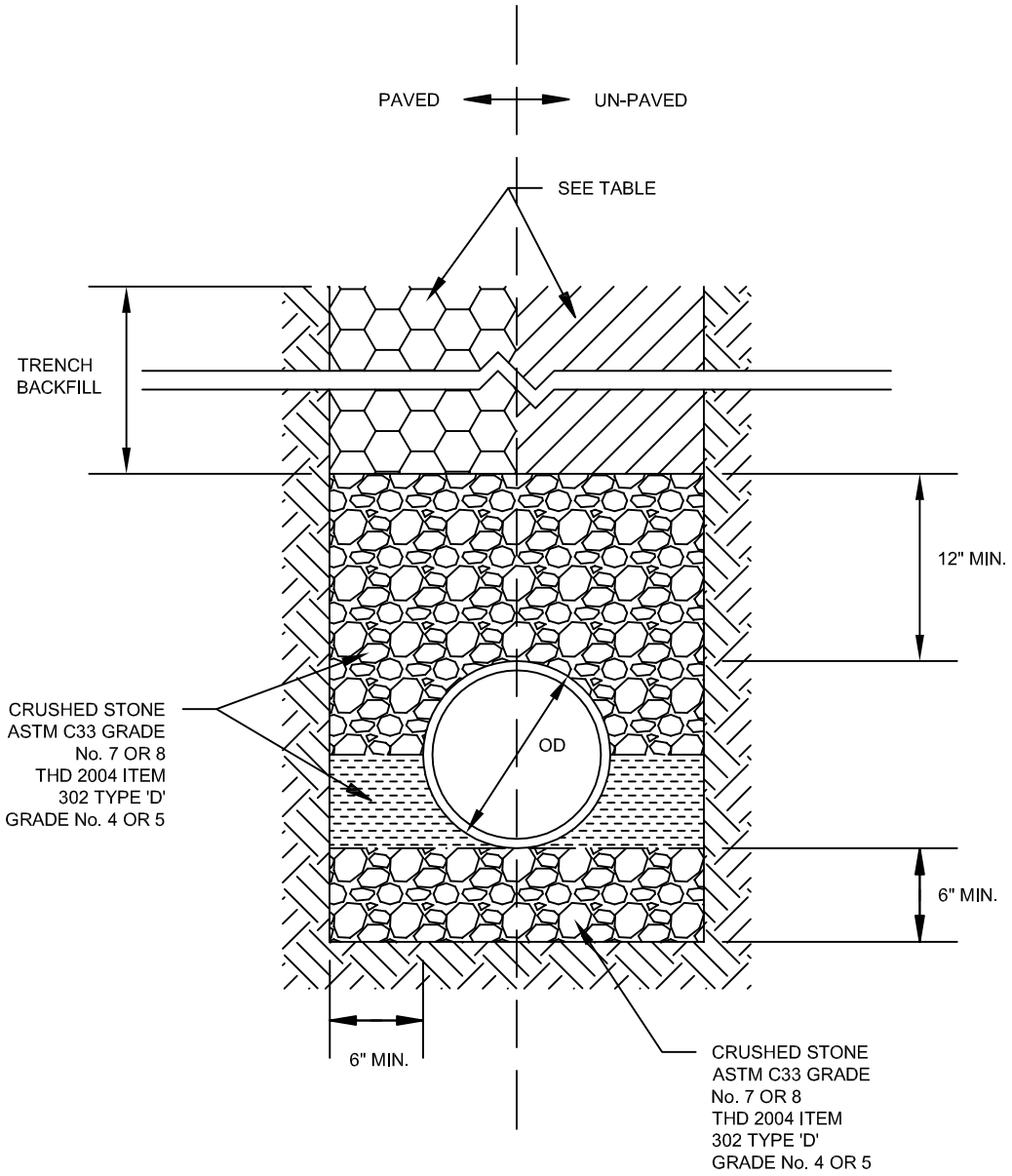
END OF MAIN SERVICE



SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
DATE:	04/25/2013	CHECKED:	D. BEARD
EFFECTIVE DATE:	07/22/2013	APPROVED:	D. BEARD
TYPICAL DEAD END CUL-DE-SAC WATER MAIN		DETAIL:	419



3		MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
2			DATE:	11/12/2013	CHECKED:	J. COHEN
1			EFFECTIVE DATE:	01/12/2014	APPROVED:	D. BEARD
REV. NO.	DATE		WATER MAIN VERTICAL OFFSET		DETAIL:	421



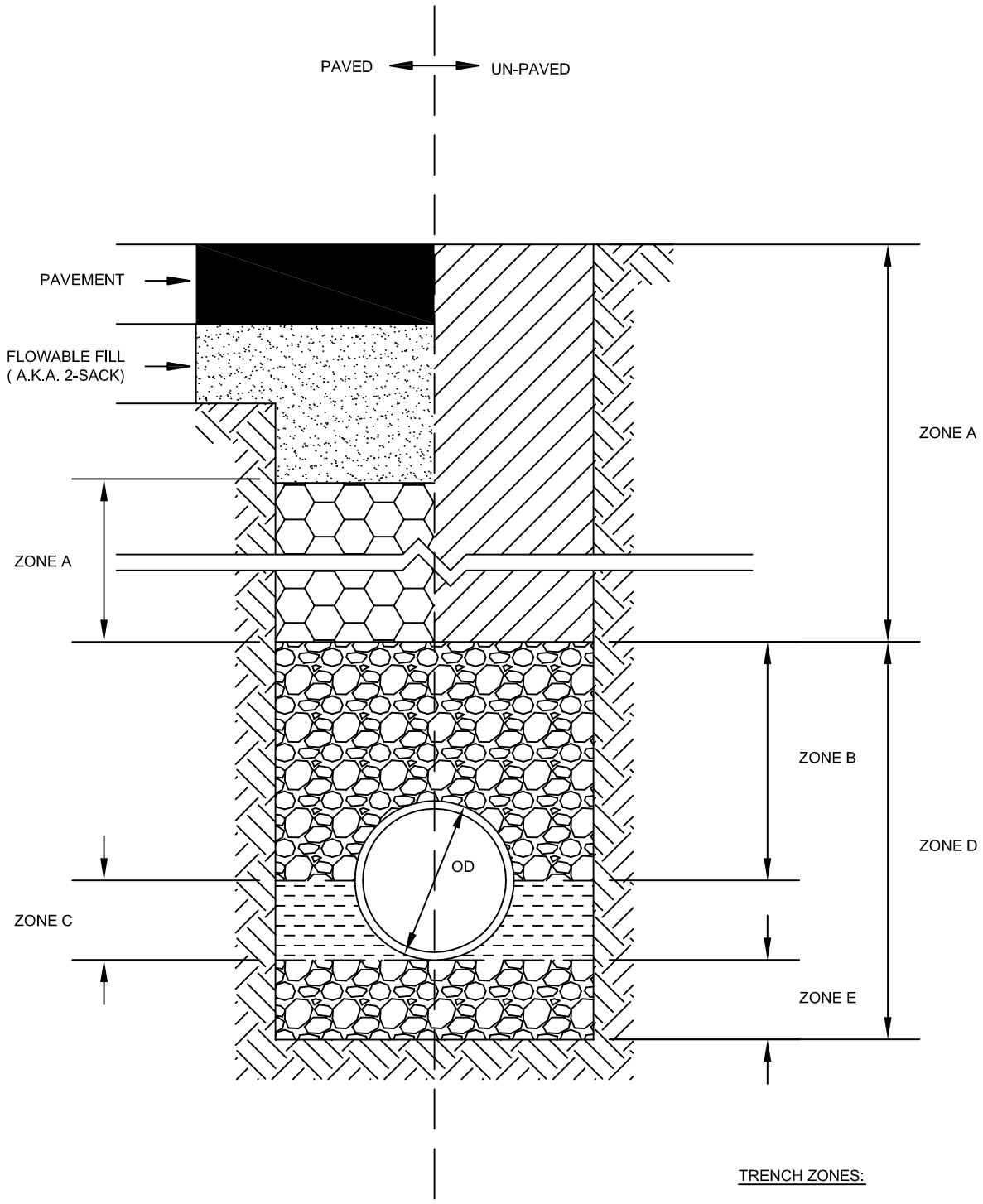
TRENCH BACKFILL REQUIREMENTS USE OF NATIVE SOIL		
BACKFILL CONDITION	UN-PAVED SURFACE	PAVED SURFACE
NATIVE SOIL	ALLOWED	ALLOWED IF: ≤ 30 LL; ≤ 15 PI
NATIVE SOIL / CRUSHER FINES	ALLOWED	ALLOWED IF: ≤ 30 LL; ≤ 15 PI
* NATIVE SOIL OR A NATIVE SOIL / CRUSHER FINES MIXTURE MAY BE USED AS BACKFILL BENEATH A PAVED SURFACE IF LAB TEST RESULTS ARE PROVIDED SHOWING THAT IT MEETS THE APPROVED CONDITION LISTED IN THIS TABLE. NATIVE SOIL MAY BE USED IN UN-PAVED AREAS WITHOUT TESTING.		

TRENCH BACKFILL NOTES:

1. APPLIES TO ALL PIPE TYPES. (DUCTILE IRON, PVC, ETC.)
2. NATIVE MATERIAL SHALL BE EXISTING EXCAVATED SOIL FROM TRENCH WITH ALL MATERIAL BROKEN DOWN ≤ 2".
3. ALL BACKFILL MATERIAL SHALL BE MOISTURE CONDITIONED PRIOR TO PLACING IN TRENCH.
4. ALL BACKFILL MATERIAL SHALL BE COMPACTED IN 8" - 12" LIFTS.
5. BACKFILL BENEATH UNPAVED ALLEYS SHALL HAVE THE SAME REQUIREMENTS AS IF THE ALLEYS WERE PAVED.
6. REFER TO CITY DETAIL 229 AND 230 FOR TRENCH PAVEMENT REPLACEMENT REQUIREMENTS.

MIDLAND Engineering Services

SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
DATE:	07/14/2014	CHECKED:	J. COHEN
EFFECTIVE DATE:	07/31/2014	APPROVED:	J. COHEN
TRENCH PIPE EMBEDMENT & BACKFILL		DETAIL:	405(A)



TRENCH ZONES:

ZONE A: TRENCH BACKFILL

ZONE B: PIPE BACKFILL

ZONE C: HAUNCHING

ZONE D: PIPE EMBEDMENT

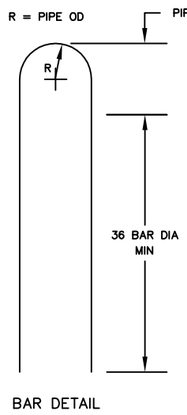
ZONE E: BEDDING

SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
DATE:	07/14/2014	CHECKED:	J. COHEN
EFFECTIVE DATE:	07/31/2014	APPROVED:	J. COHEN
TRENCH PIPE EMBEDMENT & BACKFILL		DETAIL:	405(B)

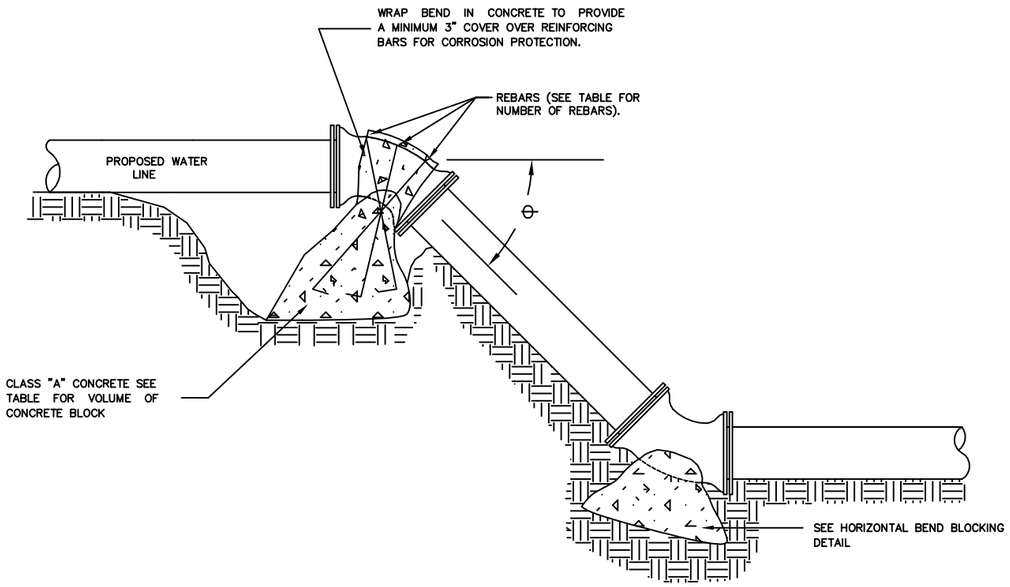
BLOCK FOR EXTERNAL VERTICAL BENDS
DESIGN PRESSURE 180 PSI

DIA. OF PIPE	DEGREE OF BEND Θ							
	11 1/4°		22 1/2°		45°		90°	
	VOLUME BLOCK	REBARS NO. SIZE	VOLUME BLOCK	REBARS NO. SIZE	VOLUME BLOCK	REBARS NO. SIZE	VOLUME BLOCK	REBARS NO. SIZE
4"	3 C.F.	2–#3	6 C.F.	2–#3	12 C.F.	2–#3	22 C.F.	2–#3
6"	7 C.F.	2–#3	13 C.F.	2–#3	26 C.F.	2–#3	1.0 C.Y.	2–#3
8"	12 C.F.	2–#3	24 C.F.	2–#3	2.0 C.Y.	2–#4	3.0 C.Y.	3–#4
10"	19 C.F.	2–#3	1.5 C.Y.	2–#4	3.0 C.Y.	3–#4	5.0 C.Y.	2–#6
12"	1.0 C.Y.	2–#3	2.0 C.Y.	2–#4	4.0 C.Y.	2–#6	7.0 C.Y.	2–#8
14"	1.5 C.Y.	2–#4	3.0 C.Y.	3–#4	5.5 C.Y.	2–#6		
16"	2.0 C.Y.	2–#4	3.5 C.Y.	3–#4	7.0 C.Y.	2–#7		

BLOCKING FOR 14" AND 16" 90° BENDS AND FOR ALL BENDS LARGER THEN 16" WILL BE SHOWN ON THE PLANS



BAR DETAIL



File: H:\detail\Details 2011\022blk_v_b11.dwg

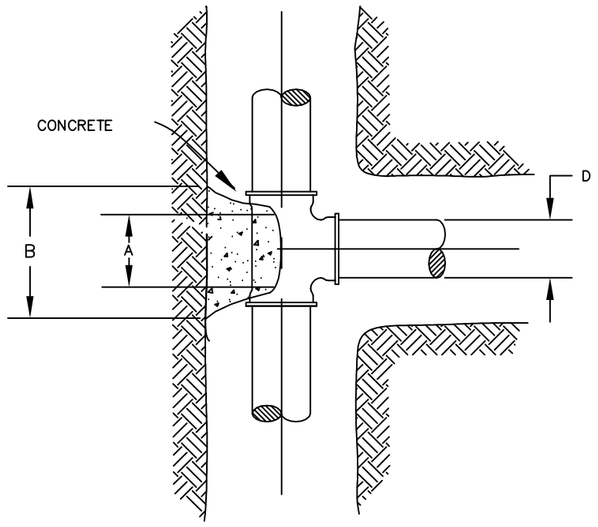
Rev. No.	Date	By	Description

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

WATER DETAILS
BLOCKING FOR VERTICAL BENDS

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S
Designed By	A.R. KARCH	Dwg. No.	W–6
Approved By	D. BEARD		



TEE

"T" BLOCKING
DESIGN 180 PSI LINE PRESSURE
SOIL BEARING CAP 2K/SF

"T" RUN DIA	STEM DIA	BLOCKING DIMENSIONS		
		A	B	*C
TEE				
4"	ALL	0'-11"	1'-0"	1'-0"
6"	ALL	1'-2"	1'-7"	1'-0"
8"	ALL	1'-4"	2'-2"	2'-2"
10"	ALL	1'-8"	2'-8"	2'-8"
12"	THRU 6"	1'-10"	1'-10"	1'-8"
12"	OVER 6"	1'-10"	3'-2"	3'-2"
14"	THRU 8"	2'-2"	2'-2"	1'-11"
14"	OVER 8"	2'-2"	3'-8"	3'-8"
16"	THRU 8"	2'-4"	2'-4"	2'-2"
16"	OVER 8"	2'-4"	4'-3"	4'-3"

*C - VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH

NOTE:

BLOCKING FOR TEES LARGER THEN 16" RUN WILL BE AS SHOWN ON THE PLANS

ALL THRUST BLOCKING SHALL BE CLASS "A" CONCRETE AND SHALL BE PLACED AGAINST UNDISTURBED EARTH.

FITTINGS SHALL BE POLY WRAPPED BEFORE BLOCKING IS PLACED

File: H:\detail\Details 2011\023blk_tee11.dwg

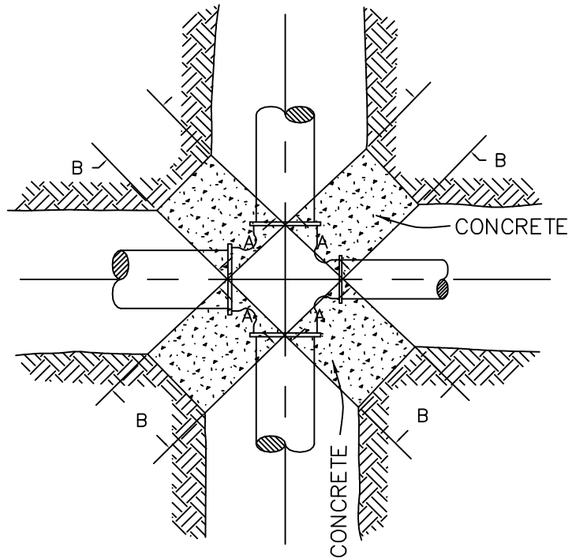
Rev. No.	Date	By	Description

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

WATER DETAILS
BLOCKING FOR TEE

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S
Designed By	A.R. KARCH	Dwg. No.	W-7
Approved By	D. BEARD		



CROSS BLOCKING

CROSS BLOCKING
DESIGN 180 PSI LINE PRESSURE
SOIL BEARING CAP 2K/SF

CROSS DIA	BLOCKING DIMENSIONS		
	A	B	*C
4"x 4"	0'-11"	1'-0"	1'-0"
6"x 6"	1'-2"	1'-7"	1'-0"
8"x 8"	1'-4"	2'-2"	2'-2"
10"x 10"	1'-8"	2'-8"	2'-8"
12"x 12"	1'-10"	3'-2"	3'-2"
14"x 14"	2'-2"	3'-8"	3'-8"
16"x 16"	2'-4"	4'-3"	4'-3"

*C – VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH

NOTE:

CROSSES WITH DIFFERENT SIZE RUN SHALL BE BLOCKED FOR THE LARGER RUN IN ALL DIRECTIONS

BLOCKING FOR CROSS LARGER THEN 16" WILL BE AS SHOWN ON THE PLANS

ALL THRUST BLOCKING SHALL BE CLASS "A" CONCRETE AND SHALL BE PLACED AGAINST UNDISTURBED EARTH.

FITTINGS SHALL BE POLY WRAPPED BEFORE BLOCKING IS PLACED

File: H:\detail\Details 2011\024blk_cr_db11.dwg

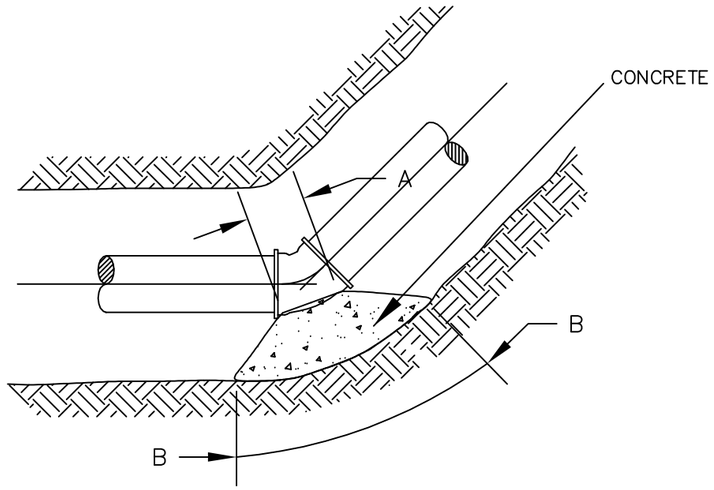
Rev. No.	Date	By	Description

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

WATER DETAILS
BLOCKING FOR CROSS

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S
Designed By	A.R. KARCH	Dwg. No.	W-8
Approved By	D. BEARD		



BEND BLOCKING

BLOCKING FOR HORIZONTAL BENDS
DESIGN 180 PSI LINE PRESSURE
SOIL BEARING CAP 2K/SF

DIA. OF PIPE	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	A	B	*C	A	B	*C	A	B	*C	A	B	*C
4"	0' –4 "	1' –0 "	1' –0 "	0' –5 "	1' –0 "	1' –0 "	0' –6 "	1' –0 "	1' –0 "	0' –11 "	1' –3 "	1' –3 "
6"	0' –7 "	1' –0 "	1' –0 "	0' –7 "	1' –0 "	1' –0 "	0' –8 "	1' –5 "	1' –5 "	1' –3 "	1' –11 "	1' –11 "
8"	0' –8 "	0' –10"	1' –2 "	0' –9 "	1' –4 "	1' –4 "	0' –10"	1' –10"	1' –10"	1' –6 "	2' –6 "	2' –6 "
10"	0' –10"	1' –0 "	1' –5 "	0' –11 "	1' –8 "	1' –8 "	1' –1 "	2' –4 "	2' –4 "	1' –11 "	3' –2 "	3' –2 "
12"	1' –0 "	1' –3 "	1' –8 "	1' –1 "	2' –0 "	2' –0 "	1' –4 "	2' –10"	2' –10"	2' –2 "	3' –10"	3' –10"
14"	0' –11 "	1' –5 "	1' –11 "	1' –1 "	2' –4 "	2' –4 "	1' –4 "	3' –3 "	3' –3 "			
16"	1' –1 "	1' –8 "	2' –2 "	1' –2 "	2' –8 "	2' –8 "	1' –5 "	3' –9 "	3' –9 "			

NOTE:

BLOCKING FOR 14" AND 16" 90° BENDS AND ALL BENDS LARGER THEN 16" WILL BE AS SHOWN ON THE PLANS

ALL THRUST BLOCKING SHALL BE CLASS "A" CONCRETE AND SHALL BE PLACED AGAINST UNDISTURBED EARTH

FITTINGS SHALL BE POLY WRAPPED BEFORE BLOCKING IS PLACED

*C – VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH

Rev. No.	Date	By	Description

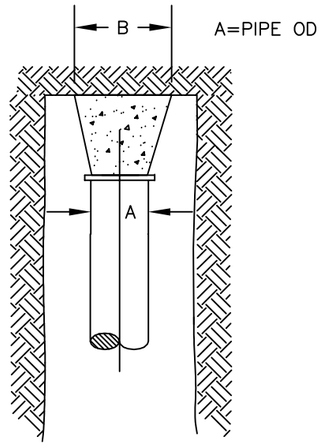
MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

WATER DETAILS
BLOCKING FOR HORIZONTAL BENDS

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S
Designed By	A.R. KARCH	Dwg. No.	W–9
Approved By	D. BEARD		

File: H:\detail\Details 2011\025blk_h_bd11.dwg



PLUG BLOCKING

PIPE OD	BLOCKING DIMENSIONS	
	B	*C
4"	1'–0"	1'–0"
6"	1'–7"	1'–0"
8"	2'–2"	2'–2"
10"	2'–8"	2'–8"
12"	3'–2"	3'–2"
14"	3'–8"	3'–8"
16"	4'–3"	4'–3"

*C – VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH

NOTE:

ALL THRUST BLOCKING SHALL BE CLASS "A" CONCRETE AND SHALL BE PLACED AGAINST UNDISTURBED EARTH.

FITTINGS SHALL BE POLY WRAPPED BEFORE BLOCKING IS PLACED

Rev. No.	Date	By	Description

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

WATER DETAILS
BLOCKING FOR PLUG

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S
Designed By	A.R. KARCH	Dwg. No.	W–10
Approved By	D. BEARD		

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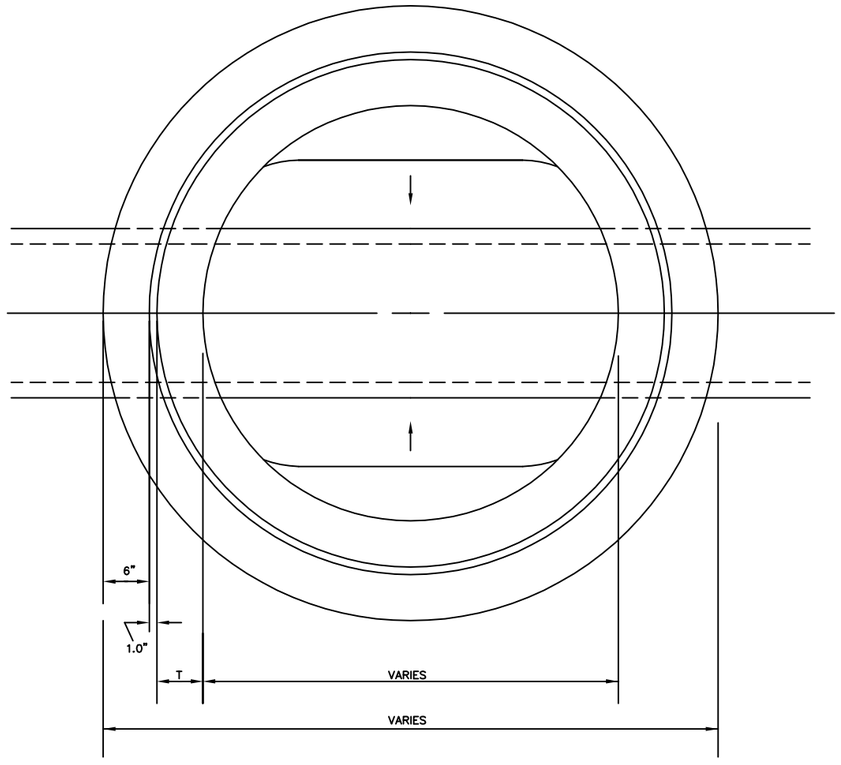
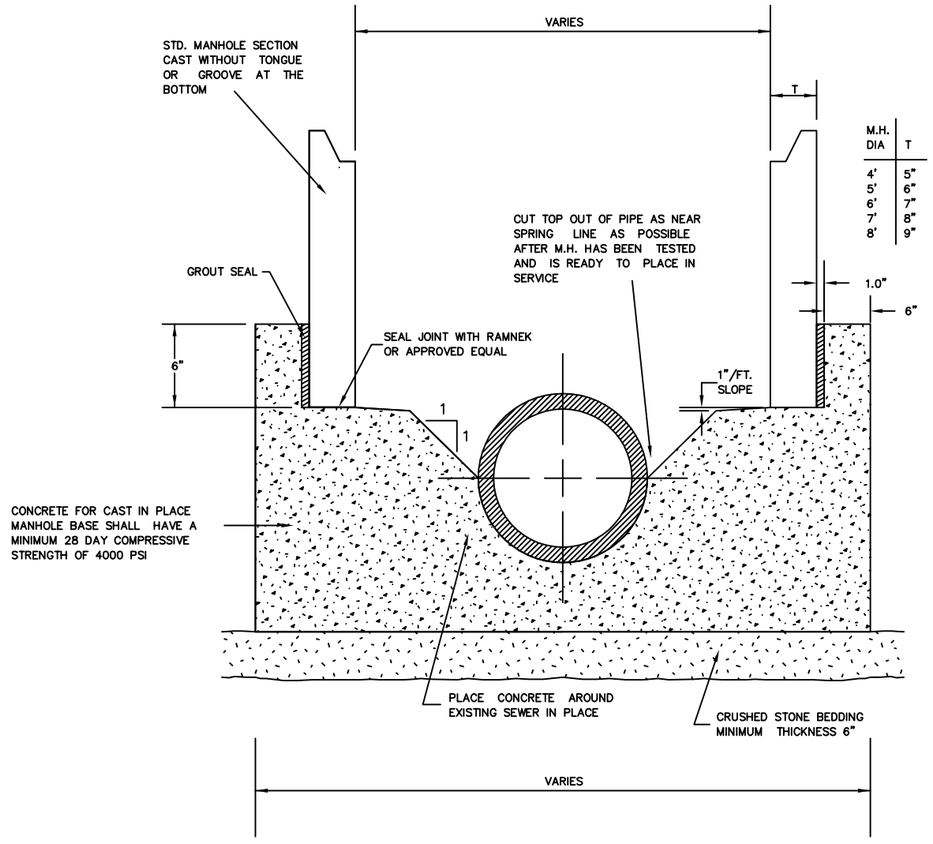
PLAN

CAST IN PLACE MANHOLE BASE





SECTION

CAST IN PLACE MANHOLE BASE

File: H:\detail\Details 2011\027mh_base11.dwg

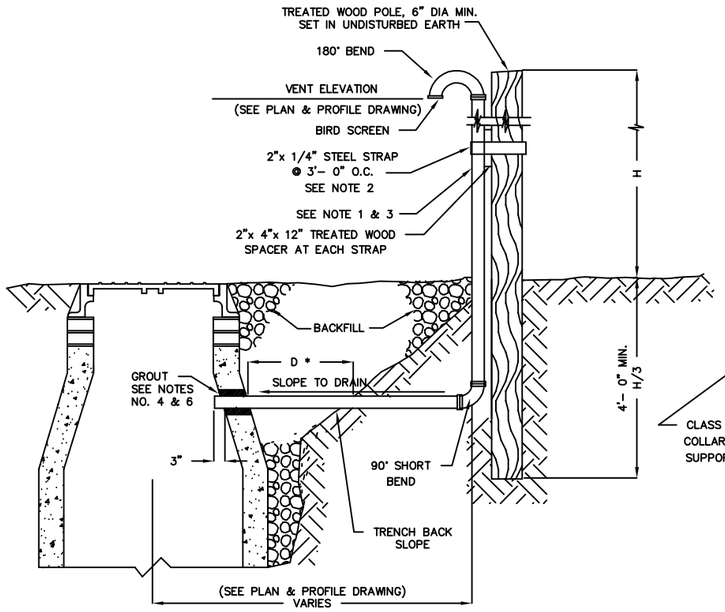
Rev. No.	Date	By	Description

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

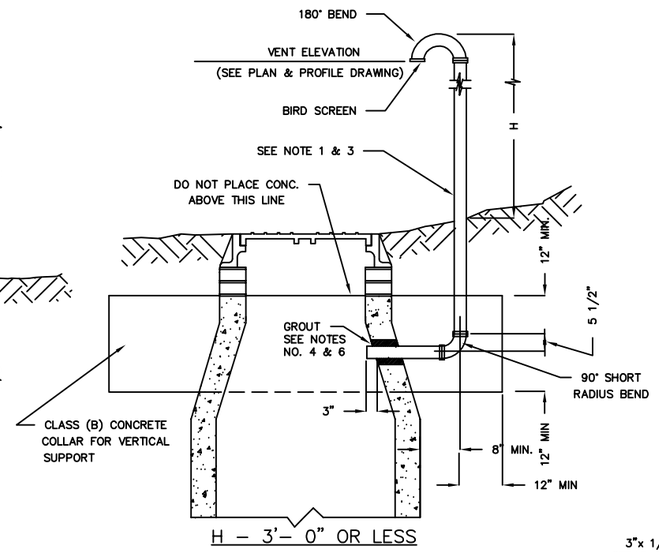
SEWER DETAILS
MANHOLE BASE CAST IN PLACE

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	S-1
Approved By	D. BEARD		



BACKFILL UNDER VENT PIPE WITH PORTLAND CEMENT STABILIZED MATERIAL. CEMENT STABILIZED BACKFILL MATERIAL MUST SUPPORT VENT PIPE FOR THE FULL SPAN D.

REMOTE VENT



H – 3'– 0" OR LESS

1 – ALL PIPING SHALL BE 3" DIA. DUCTILE IRON WITH FLANGED JOINTS COATED INSIDE AND OUTSIDE

2 – PAINT ALL STRAPPING WITH 2 COATS OF COAL–TAR EPOXY.

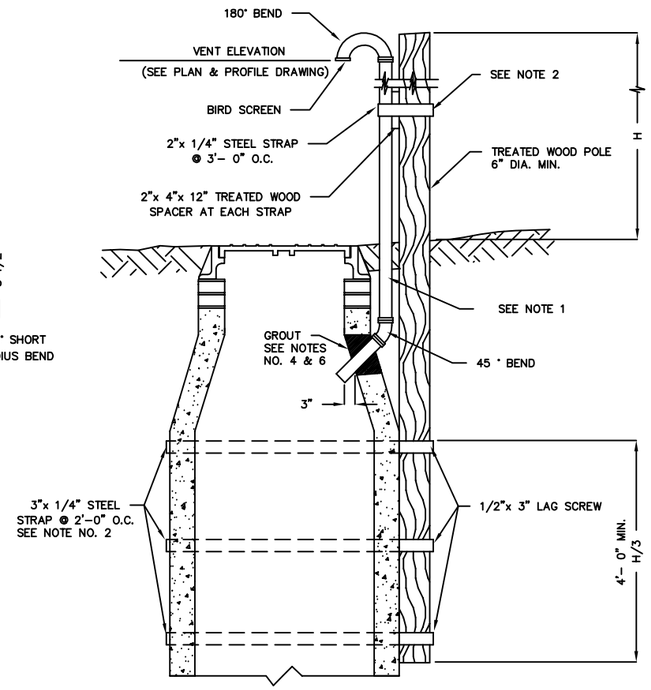
3 – PAINT ALL EXPOSED PIPING WITH 2 COAT OF COAL TAR EPOXY.

4 – APPROVED WATER TIGHT MANHOLE CONNECTOR INSTALLED PER SPECIFICATIONS AND / OR MANUFACTURE'S INSTRUCTIONS.

5 – SEE PLAN AND PROFILE SHEETS FOR MANHOLE INVERT DETAILS.

6 – GROUT SHALL BE APPROVED NON–SHRINK TYPE

7 – MANHOLE VENT TO BE USED IN CONJUCTION WITH WATER TIGHT MANHOLE RINGS & COVERS SPACED EVERY THIRD MANHOLE OR AS SHOWN ON THE PLANS.



H – OVER 3'– 0"

Rev. No.	Date	By	Description

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

SEWER DETAILS
MANHOLE VENT

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	S–2
Approved By	D. BEARD		

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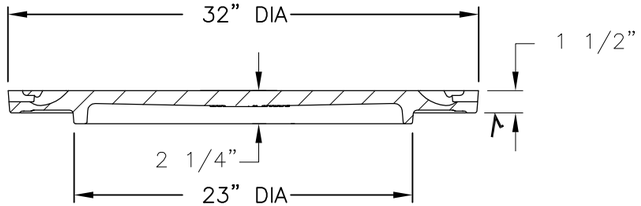
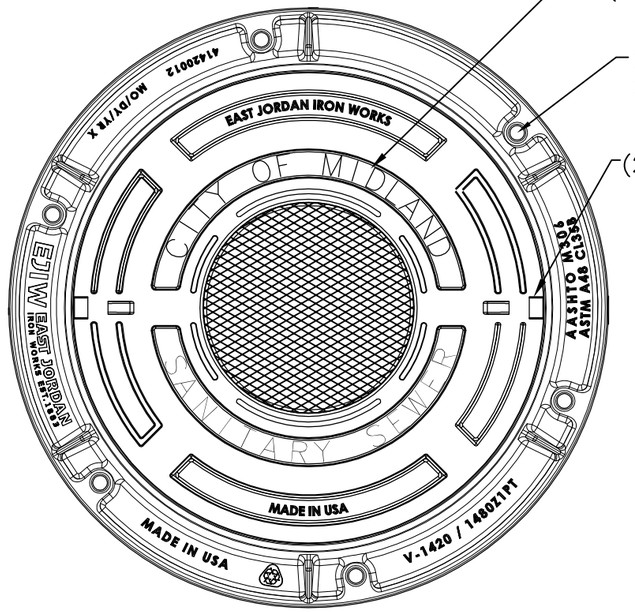
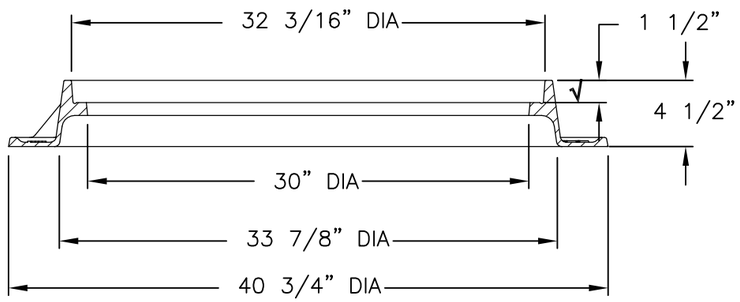


COVER SECTION

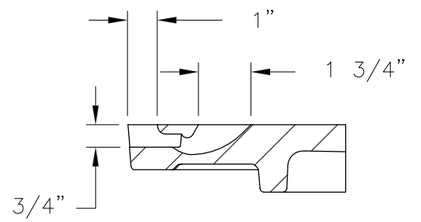


SOLID MANHOLE COVERS SHALL BE CAST WITH THE FOLLOWING:
"CITY OF MIDLAND"
"SANITARY SEWER"
OR
"CITY OF MIDLAND"
"STORM SEWER"

GRATE TYPE LID TO BE FURNISHED FOR STORM SEWERS WHEN CALLED FOR ON THE PLANS AND/OR BID PROPOSAL.



FRAME SECTION



PICKHOLE DETAIL

EAST JORDAN IRON WORKS V1420/1480Z1
V1430ADI
OR APPROVED EQUAL

Rev. No.	Date	By	Description

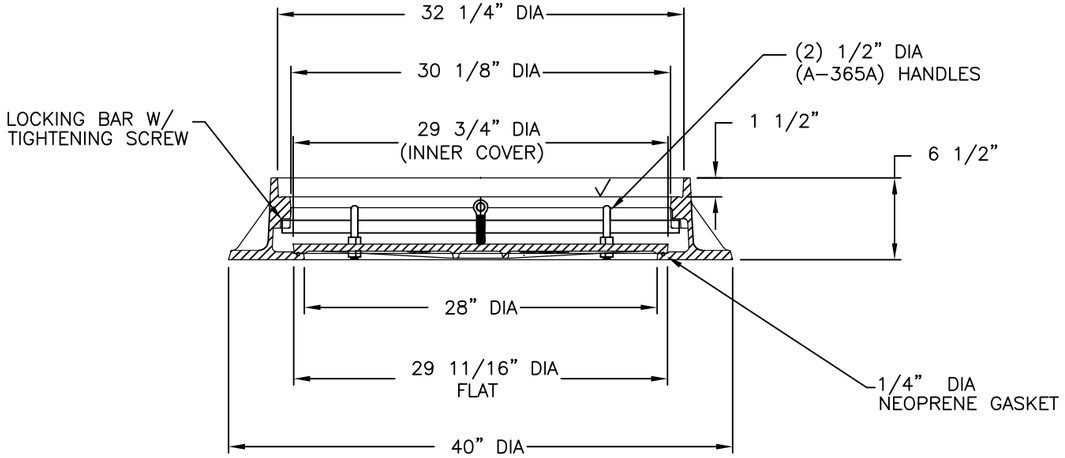
MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

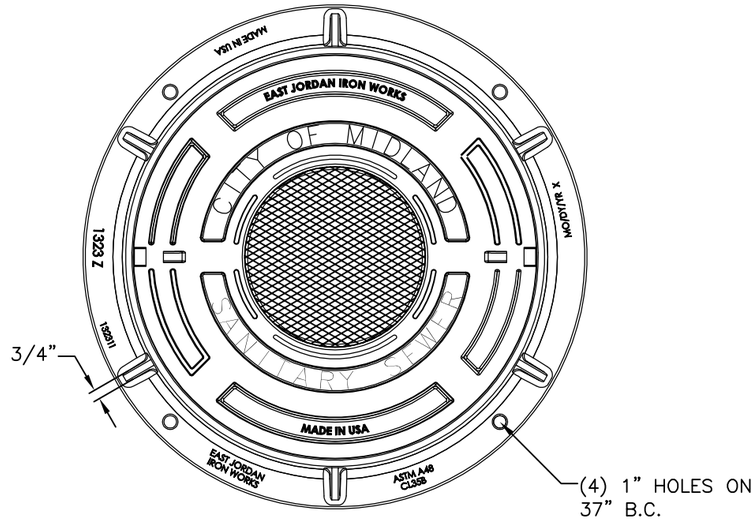
SEWER DETAILS
SANITARY & STORM SEWER MANHOLE COVERS

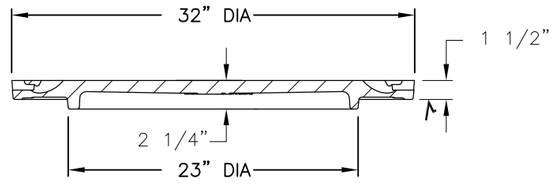
Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	S-3a
Approved By	D. BEARD		

File: H:\detail\Details 2011\029-031mh_r_c_11.dwg

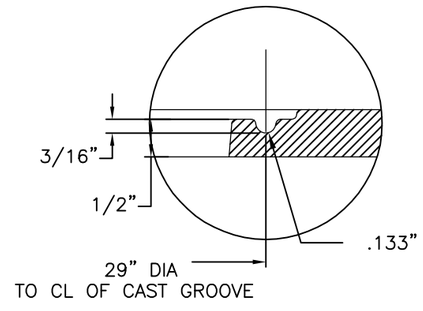


FRAME SECTION





OUTER COVER SECTION



LOWER CAST
GROOVE DETAIL

SOLID MANHOLE COVERS SHALL BE CAST WITH THE FOLLOWING:
"CITY OF MIDLAND"
"SANITARY SEWER"
OR
"CITY OF MIDLAND"
"STORM SEWER"

EAST JORDAN IRON WORKS V1430ADI
1323G
1323Z
OR APPROVED EQUAL

Rev. No.	Date	By	Description

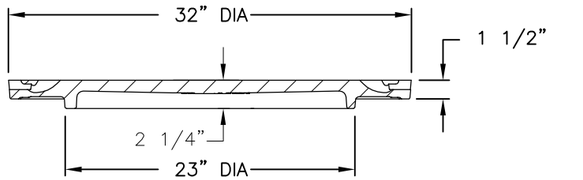
MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

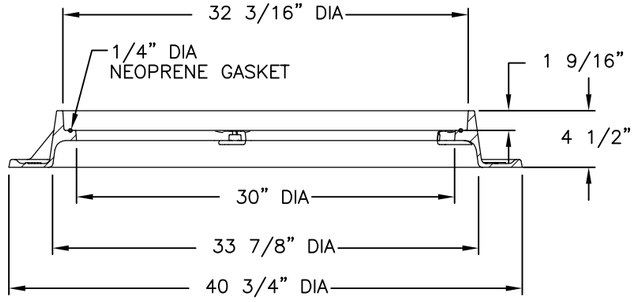
SEWER DETAILS
SANITARY & STORM SEWER MANHOLE COVERS

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	S-3b
Approved By	D. BEARD		

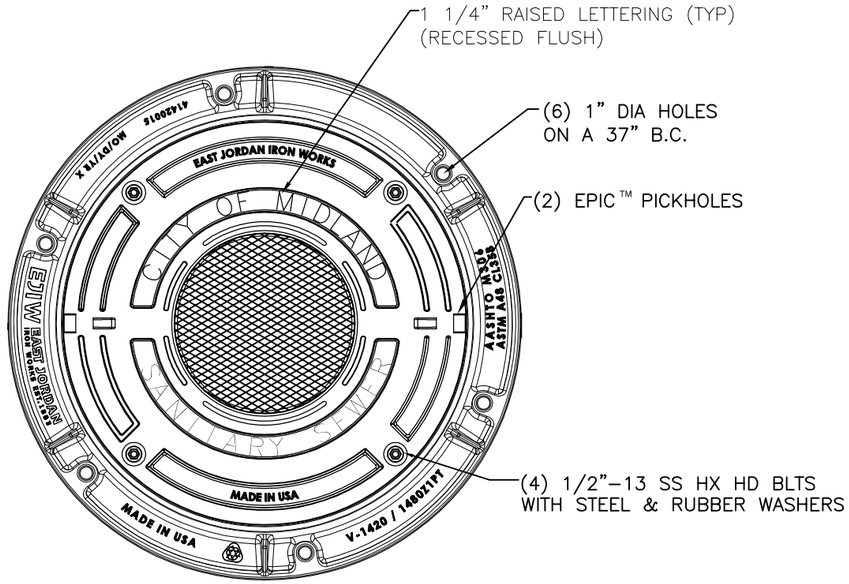
File: H:\detail\Details 2011\029-031mh_r_c_11.dwg



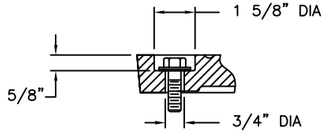
COVER SECTION



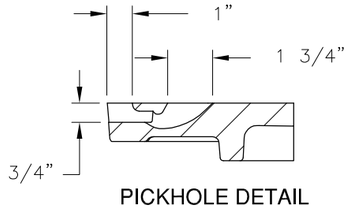
FRAME SECTION



SOLID MANHOLE COVERS SHALL BE CAST WITH THE FOLLOWING:
"CITY OF MIDLAND"
"SANITARY SEWER"
OR
"CITY OF MIDLAND"
"STORM SEWER"



BOLTING DETAIL



PICKHOLE DETAIL

EAST JORDAN IRON WORKS V1420/1480Z1 PT
V1430APT DI
OR APPROVED EQUAL

Rev. No.	Date	By	Description

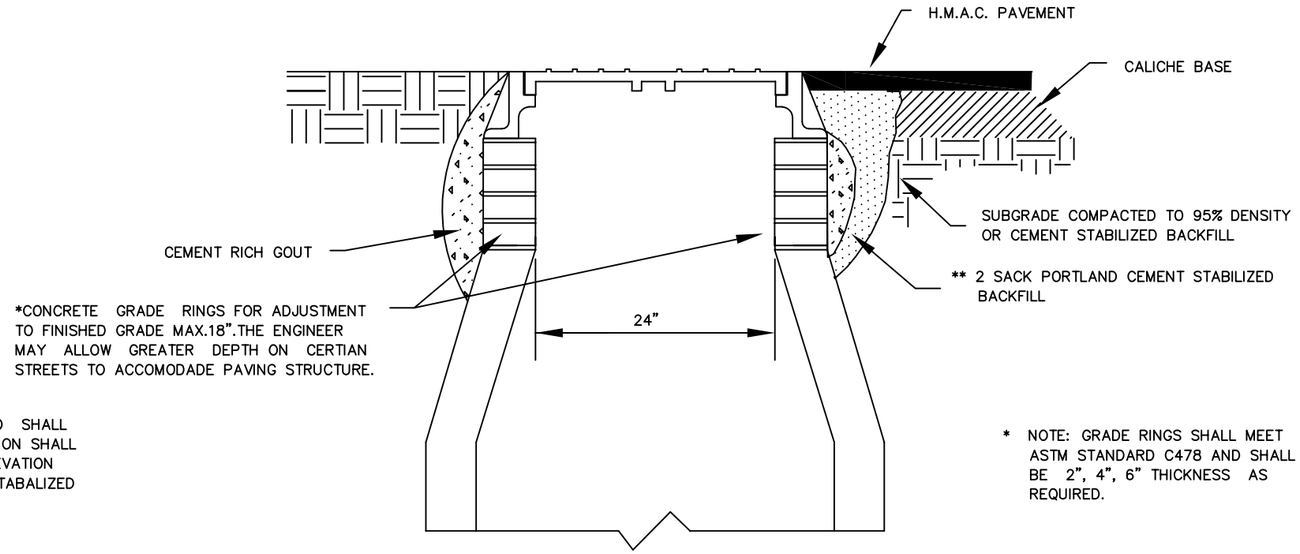
MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

SEWER DETAILS
SANITARY & STORM SEWER MANHOLE COVERS

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	S-3c
Approved By	D. BEARD		

File: H:\detail\Details 2011\029-031mh_r_c_11.dwg



**NOTE: ALL MATERIAL EXCAVATED SHALL BE REMOVED FROM SITE & EXCAVATION SHALL BE FILLED TO FINISHED BASE ELEVATION WITH 2 SACK PORTLAND CEMENT STABALIZED BACK FILL OR CHAT

* NOTE: GRADE RINGS SHALL MEET ASTM STANDARD C478 AND SHALL BE 2", 4", 6" THICKNESS AS REQUIRED.

MANHOLE ADJUSTMENT

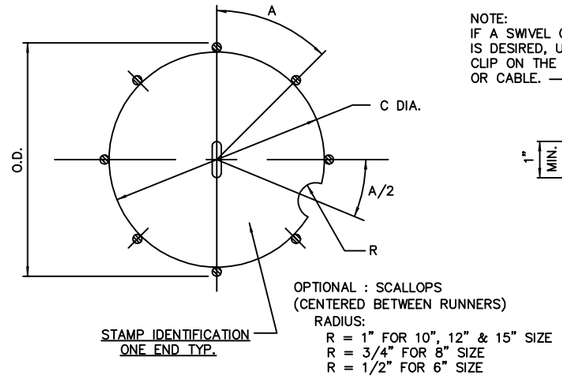
Rev. No.	Date	By	Description

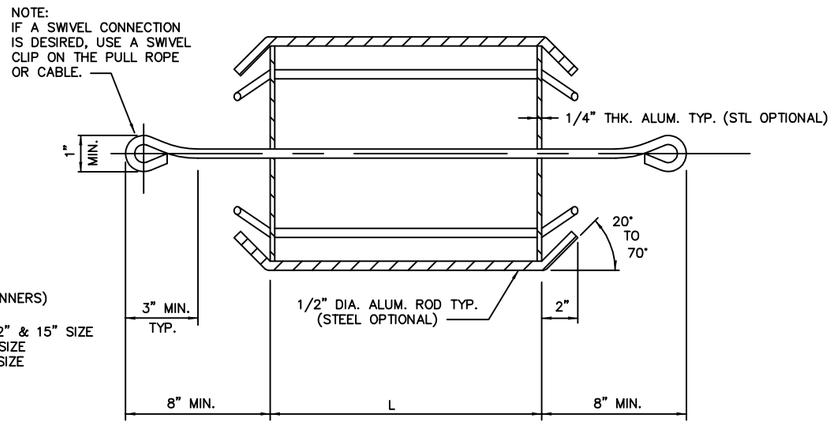
MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Manhole Adjustments

Dwg. Name	mh_adj07
Drawn By	V.M. Lowe
Checked By	R. Franks
Approved By	J.P. Robertson

Dwg. No.	S-5
Date	Octocber 2007
Scale	N.T.S.





NUMBER OF RUNNERS	7	8	9	10	11	12
ANGLE A	51.4°	45°	40°	36°	32.7°	30°

	SDR-26			SDR-35		L		
STAMPED IDENTIFICATION	O.D.	C	STAMPED IDENTIFICATION	O.D.	C	MIN.	MAX.	OVERALL LENGTH OF RUNNER MATERIAL REQUIRED = L + 4" / OVERALL LENGTH OF CENTER ROD MATERIAL REQUIRED = L + 26"	GO/NO-GO MANDREL FOR ASTM D-3034 SDR-26 & SDR-35 GRAVITY SEWER PIPE DEFLECTION TESTING OF INSTALLED SEWER PIPE
D-3034 SDR-26 15" 5%	12.90	11.90	D-3034 SDR-35 15" 5%	13.20	12.20	4" TO	15"		
D-3034 SDR-26 12" 5%	10.55	9.55	D-3034 SDR-35 12" 5%	10.79	9.79	3-1/2" TO	12"		
D-3034 SDR-26 10" 5%	8.87	7.87	D-3034 SDR-35 10" 5%	9.08	8.08	2-3/4" TO	10"		
D-3034 SDR-26 8" 5%	7.11	6.11	D-3034 SDR-35 8" 5%	7.28	6.28	2-1/4" TO	8"		
D-3034 SDR-26 6" 5%	5.33	4.33	D-3034 SDR-35 6" 5%	5.45	4.45	1-3/4" TO	6"		
ALL DIMENSIONS IN INCHES	TOLERANCE +0.000 −0.040			TOLERANCE +0.000 −0.040		TOLERANCE	± 1/16"		

NOTE:

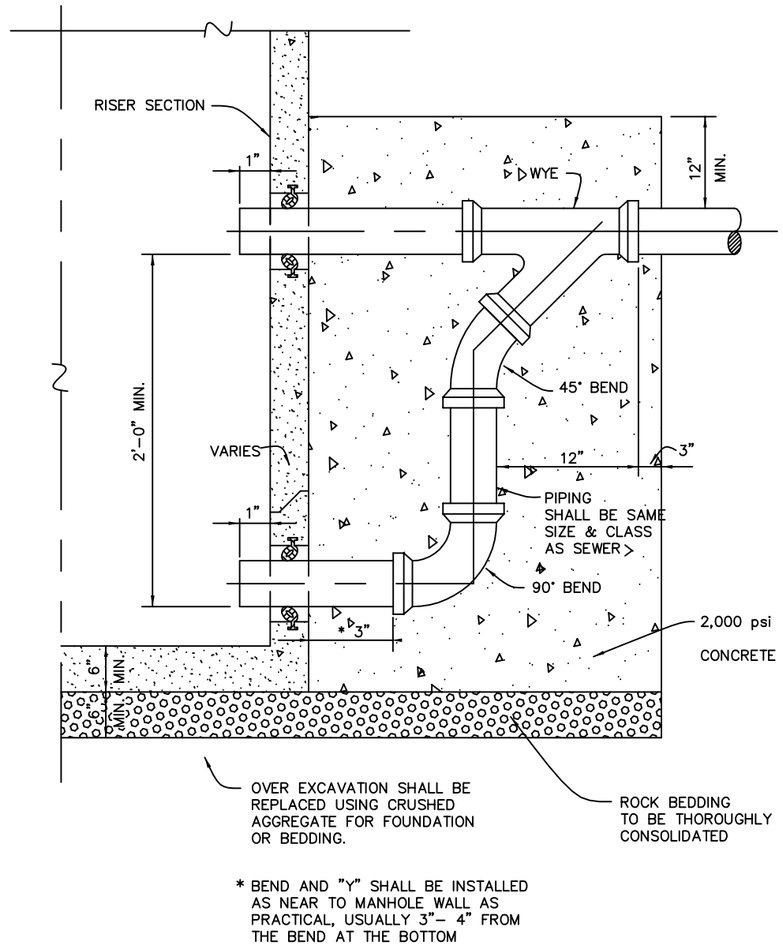
SEWER LINES SHALL NOT BE DEFLECTION TESTED UNTIL ALL BACKFILLED HAS BEEN COMPLETED, IN PLACE, FOR A MINIMUM OF 30 DAYS.

Rev. No.	Date	By	Description

MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Mandrel

Dwg. Name	mandrel07
Drawn By	V.M. Lowe
Checked By	R. Franks
Approved By	J.P. Robertson
Dwg. No.	S-6
Date	October 2007
Scale	N.T.S.



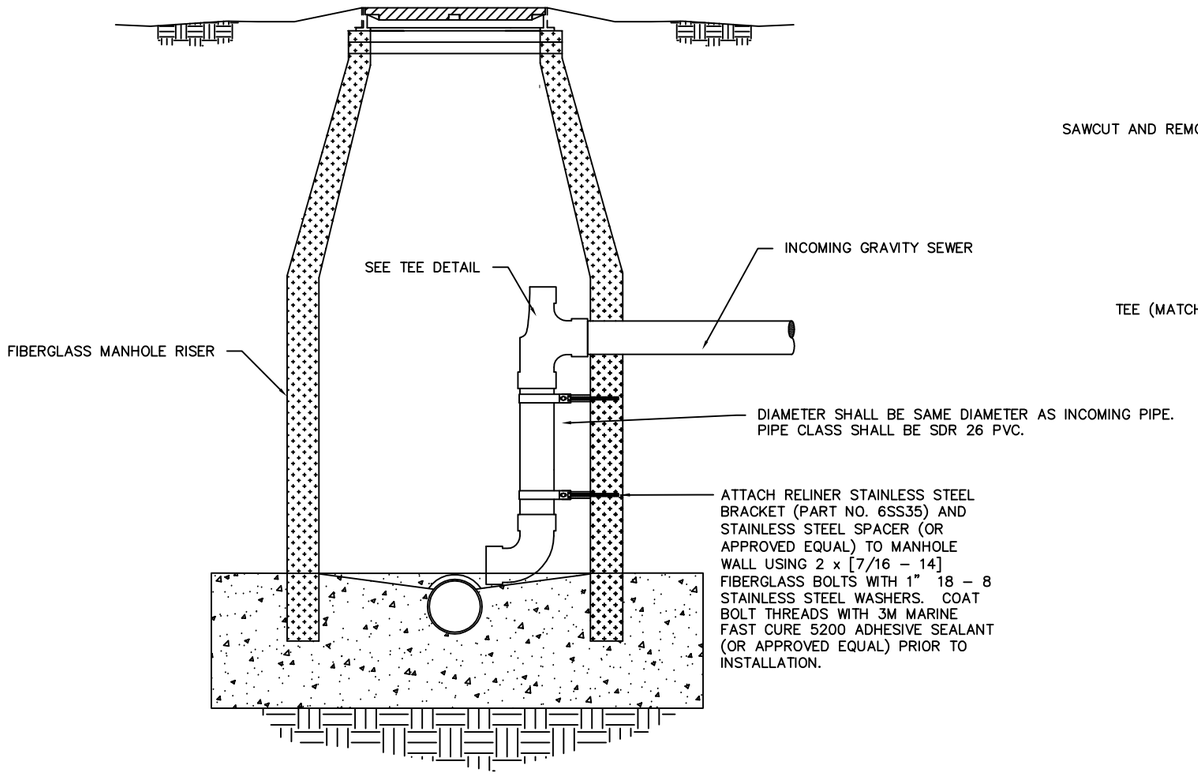
* BEND AND "Y" SHALL BE INSTALLED AS NEAR TO MANHOLE WALL AS PRACTICAL, USUALLY 3"– 4" FROM THE BEND AT THE BOTTOM

Rev. No.	Date	By	Description

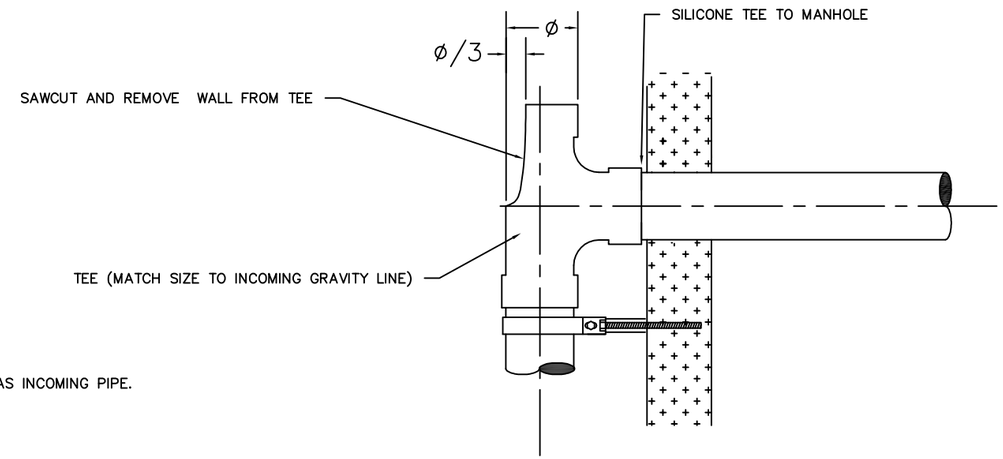
MIDLAND Engineering Services

Engineering Services Division
Development Services Department
City Design and Construction Standards
Drop Manhole

Dwg. Name	drop_mh07	Dwg. No.	S–9
Drawn By	V.M. Lowe		
Checked By	R. Franks	Date	October 2007
Approved By	J.P. Robertson	Scale	N.T.S.



INTERNAL DROP STRUCTURE



TEE DETAIL

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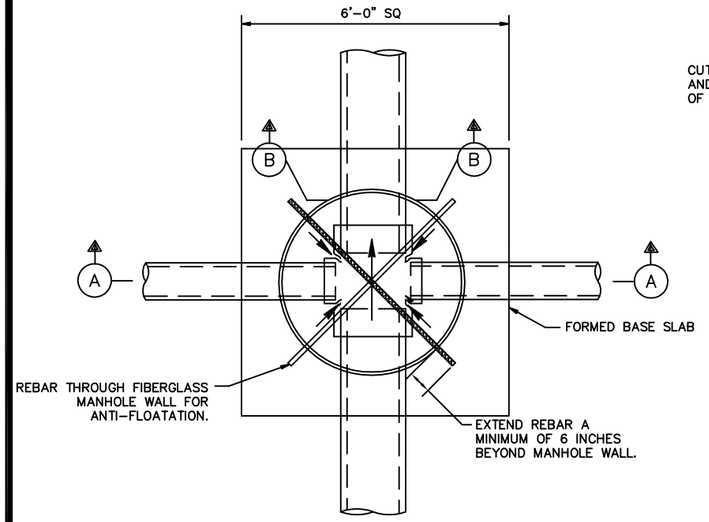
Rev. No.	Date	By	Description

MIDLAND Engineering Services

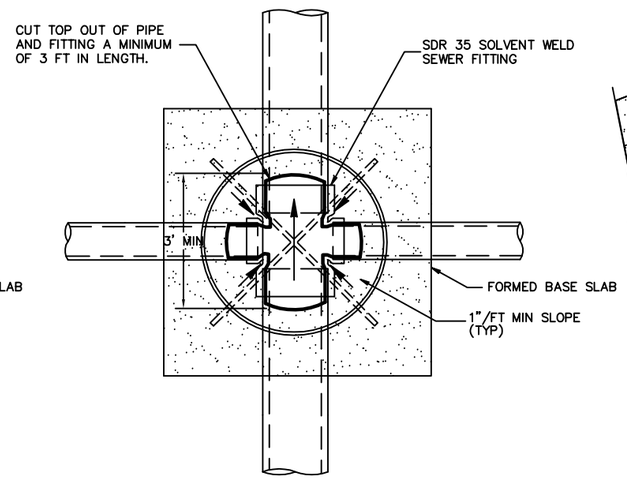
ENGINEERING SERVICES DEPARTMENT

CITY DESIGN AND CONSTRUCTION STANDARDS
INTERNAL DROP MANHOLE

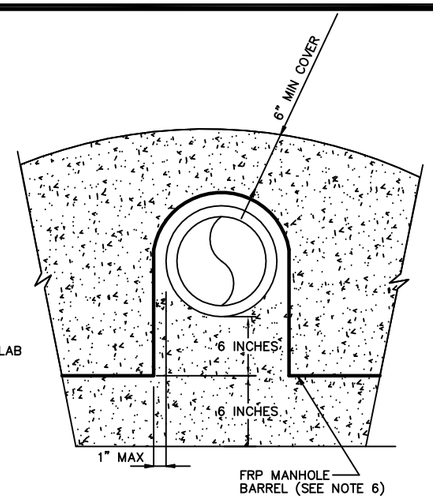
Date	MARCH 2012	Horiz. Scale	N.T.S.
Drawn By	S. SWONKE	Vert. Scale	N.T.S.
Designed By	S. SWONKE	Dwg. No.	
Approved By	D. BEARD		



FOUNDATION PLAN



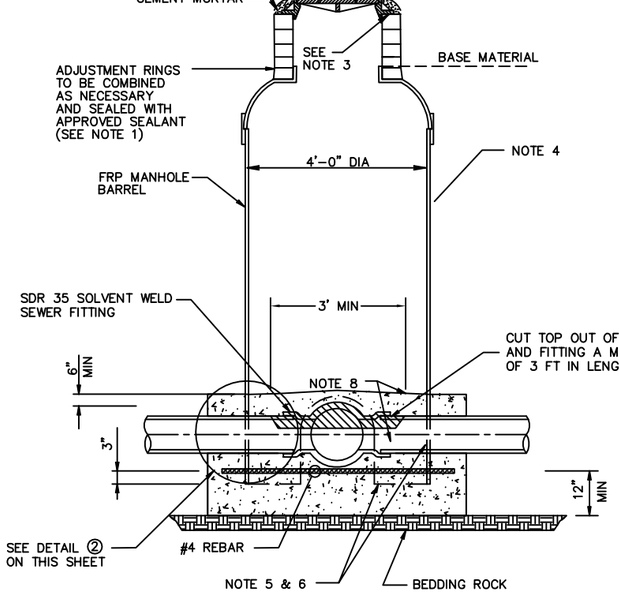
FOUNDATION PLAN



SECTION (B)

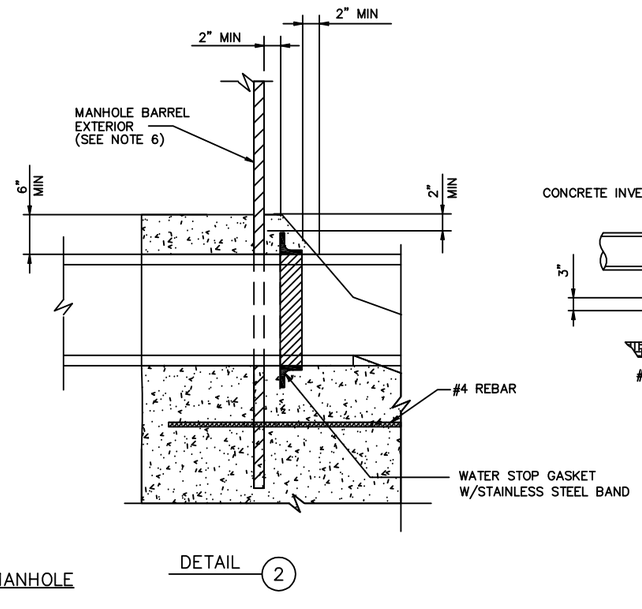
NOTES:

1. POLYETHYLENE RINGS SHALL BE PROVIDED FOR A COMBINED ADJUSTMENT HEIGHT OF AT LEAST 4". THE TOTAL HEIGHT OF THE ADJUSTMENT RINGS SHALL NOT EXCEED 12", UNLESS NEEDED TO KEEP FRP SECTION BELOW BASE WATERLID.
2. DROPS AND INTERSECTING PIPES SHALL BE INSTALLED ONLY WHEN CALLED FOR IN PLAN AND PROFILE DRAWINGS.
3. SEAT MANHOLE FRAME IN SEALANT PER COM STANDARD SPECIFICATION.
4. MANUFACTURED WATERTIGHT CONNECTOR, CORE DRILL AND INSTALL PER MANUFACTURERS RECOMMENDATIONS.
5. MAKE CUTOUT FOR PIPE PENETRATION TO FOLLOW CURVATURE OF THE PIPE AND WITH A MAXIMUM OF 1" CLEARANCE.
6. PIPE PENETRATION CUTOUT MAY EXTEND TO THE BARREL BOTTOM (AS SHOWN IN SECTION B) OR BE A CONCENTRIC HOLE, AS SHOWN IN DETAIL 2. RESIN.
7. GRATE TYPE LID TO BE FURNISHED FOR STORM SEWERS WHEN CALLED FOR ON THE PLANS AND/OR BID PROPOSAL. SEE DETAIL SHEET SANITARY & STORM SEWER MANHOLE COVER. EAST JORDAN IRON WORKS RING AND COVER V1420/1480Z1, V1430ADI OR APPROVED EQUAL.
8. FORM FLOW SURFACE AND MOUND CONCRETE AROUND PIPE PENETRATIONS, TO FORM A SEAL, IN ONE CONTINUOUS PLACEMENT OPERATION.
9. LOCK RING & COVER USE EAST JORDAN IRON WORKS V/1430ADI/1323G/1323Z OR APPROVED EQUAL. SEE DETAIL SHEET 5-3b.
10. WATER TIGHT RING & COVER USE EAST JORDAN IRON WORKS V/1420/1480Z1 PT V1430 APT DI OR APPROVED EQUAL. SEE DETAIL SHEET 5-3c.

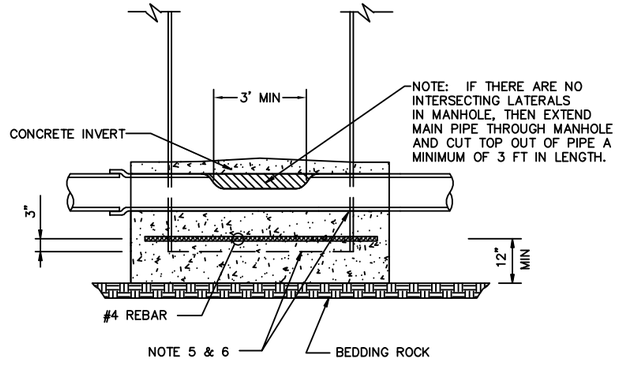


SECTION (A)

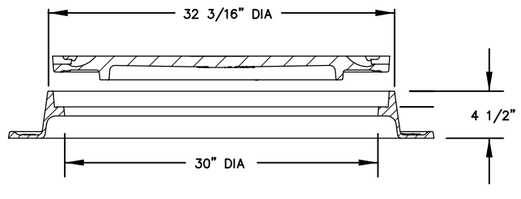
FIBERGLASS MANHOLE



DETAIL (2)



CITY OF MIDLAND
SANITARY SEWER



STANDARD MANHOLE RING & COVER

EAST JORDAN IRON WORKS V1420/1480Z1/V1430ADI OR APPROVED EQUAL. DETAIL 5-3a

Rev. No.	Date	By	Description
1	6/16/09	VML	CLARIFY NOTES

MIDLAND Engineering Services

ENGINEERING SERVICES DIVISION
DEVELOPMENT SERVICES DEPARTMENT

SEWER DETAILS
SANITARY SEWER MANHOLE

Date	JUNE 2011	Horiz. Scale	N.T.S.
Drawn By	A.R. KARCH	Vert. Scale	N.T.S.
Designed By	A.R. KARCH	Dwg. No.	S-10
Approved By	D. BEARD		

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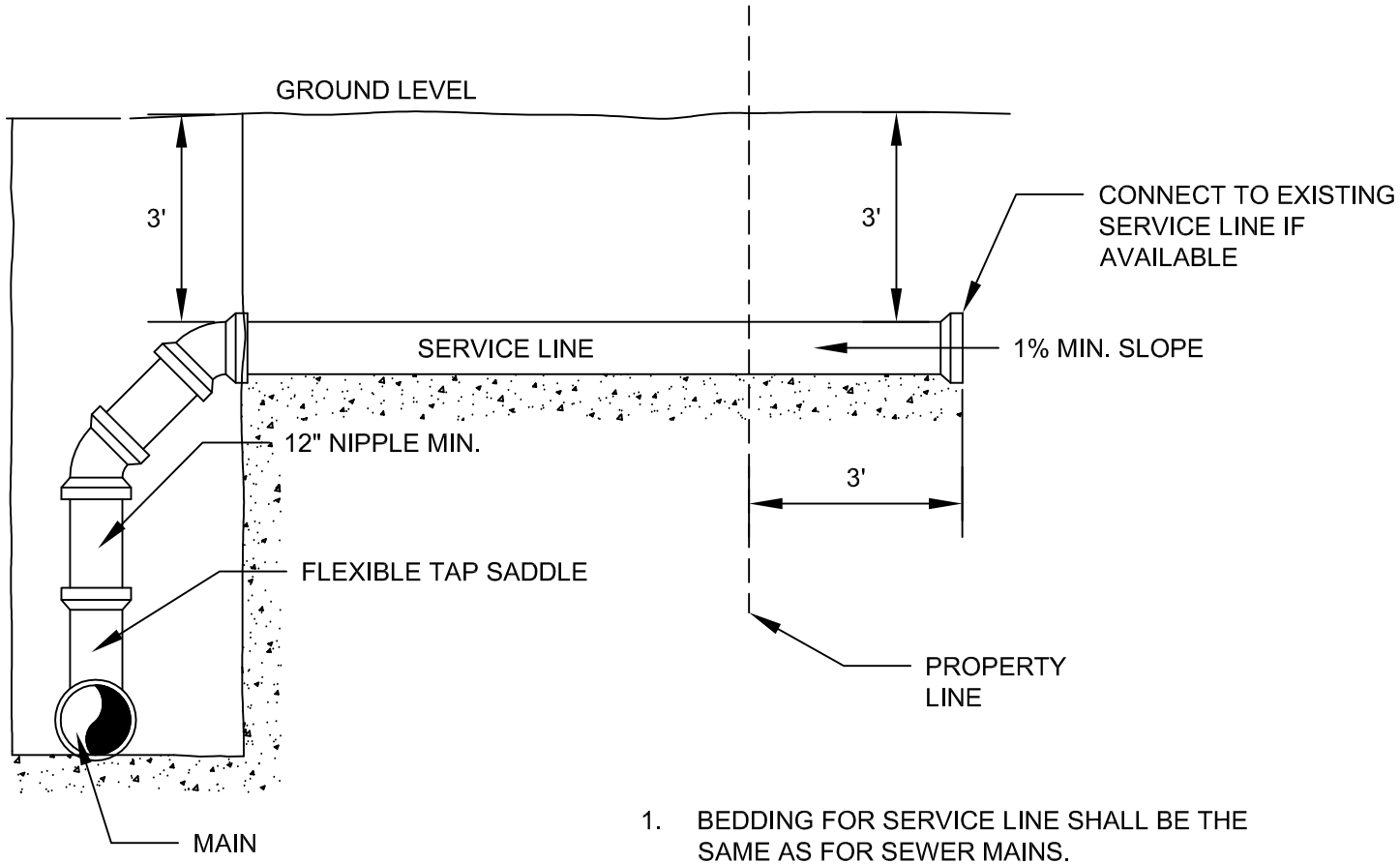
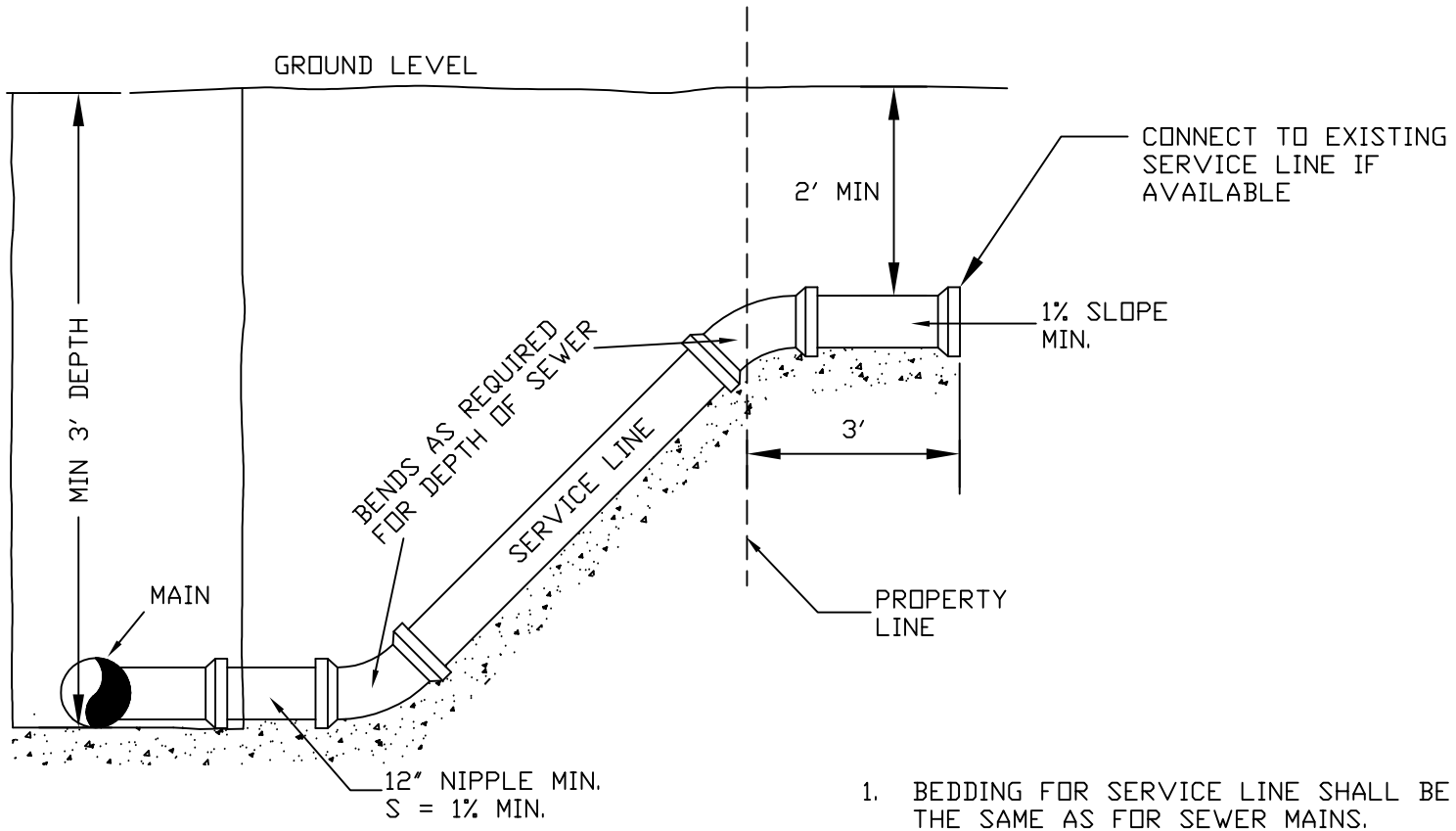


1. BEDDING FOR SERVICE LINE SHALL BE THE SAME AS FOR SEWER MAINS.

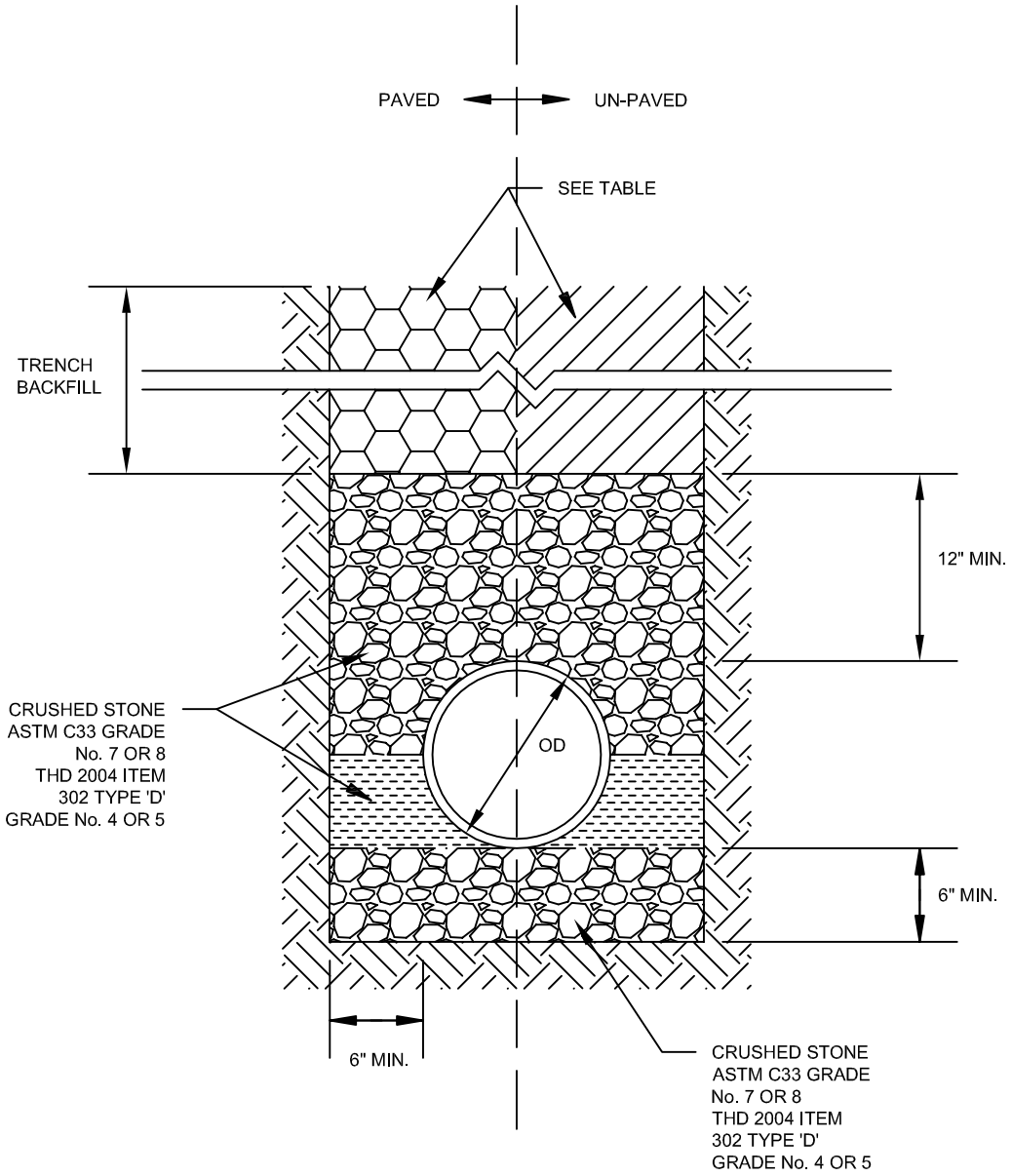
MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
	DATE:	10/11/2012	CHECKED:	D. BEARD
	EFFECTIVE DATE:	12/11/2012	APPROVED:	D. BEARD
	WASTEWATER SERVICE LINE TAP OPTION 1		DETAIL:	507



1. BEDDING FOR SERVICE LINE SHALL BE THE SAME AS FOR SEWER MAINS.

SECTION

MIDLAND Engineering Services	SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
	DATE:	07/31/2014	CHECKED:	J. COHEN
	EFFECTIVE DATE:	07/31/2014	APPROVED:	J. COHEN
	WASTEWATER SERVICE LINE TAP OPTION 2		DETAIL:	508



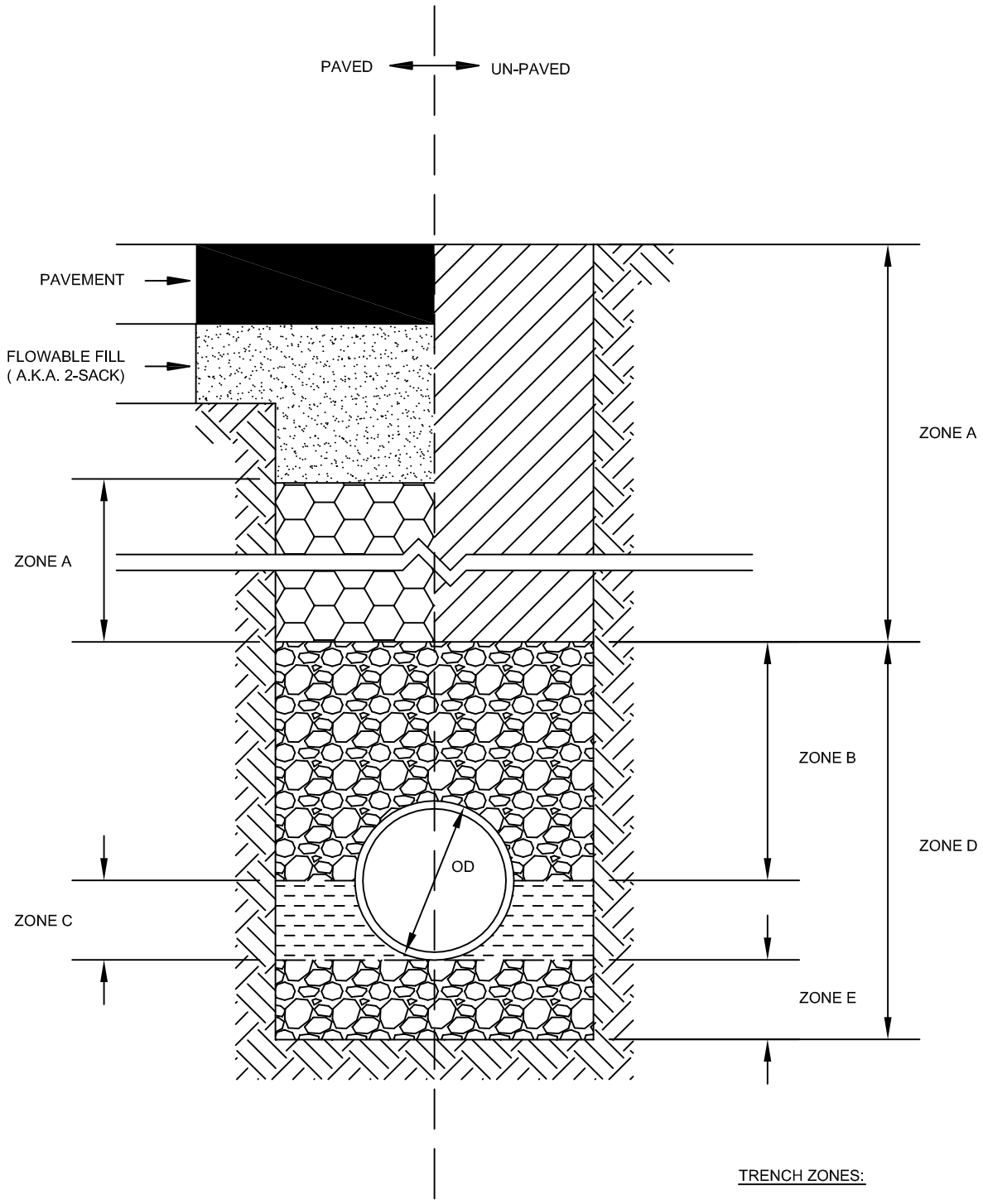
TRENCH BACKFILL REQUIREMENTS USE OF NATIVE SOIL		
BACKFILL CONDITION	UN-PAVED SURFACE	PAVED SURFACE
NATIVE SOIL	ALLOWED	ALLOWED IF: ≤ 30 LL; ≤ 15 PI
NATIVE SOIL / CRUSHER FINES	ALLOWED	ALLOWED IF: ≤ 30 LL; ≤ 15 PI
* NATIVE SOIL OR A NATIVE SOIL / CRUSHER FINES MIXTURE MAY BE USED AS BACKFILL BENEATH A PAVED SURFACE IF LAB TEST RESULTS ARE PROVIDED SHOWING THAT IT MEETS THE APPROVED CONDITION LISTED IN THIS TABLE. NATIVE SOIL MAY BE USED IN UN-PAVED AREAS WITHOUT TESTING.		

TRENCH BACKFILL NOTES:

1. APPLIES TO ALL PIPE TYPES. (DUCTILE IRON, PVC, ETC.)
2. NATIVE MATERIAL SHALL BE EXISTING EXCAVATED SOIL FROM TRENCH WITH ALL MATERIAL BROKEN DOWN ≤ 2".
3. ALL BACKFILL MATERIAL SHALL BE MOISTURE CONDITIONED PRIOR TO PLACING IN TRENCH.
4. ALL BACKFILL MATERIAL SHALL BE COMPACTED IN 8" - 12" LIFTS.
5. BACKFILL BENEATH UNPAVED ALLEYS SHALL HAVE THE SAME REQUIREMENTS AS IF THE ALLEYS WERE PAVED.
6. REFER TO CITY DETAIL 229 AND 230 FOR TRENCH PAVEMENT REPLACEMENT REQUIREMENTS.

MIDLAND Engineering Services

SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
DATE:	07/14/2014	CHECKED:	J. COHEN
EFFECTIVE DATE:	07/31/2014	APPROVED:	J. COHEN
TRENCH PIPE EMBEDMENT & BACKFILL		DETAIL:	509(A)



TRENCH ZONES:

ZONE A: TRENCH BACKFILL

ZONE B: PIPE BACKFILL

ZONE C: HAUNCHING

ZONE D: PIPE EMBEDMENT

ZONE E: BEDDING

SCALE:	NOT TO SCALE	DRAWN:	J. FERGUSON
DATE:	07/14/2014	CHECKED:	J. COHEN
EFFECTIVE DATE:	07/31/2014	APPROVED:	J. COHEN
TRENCH PIPE EMBEDMENT & BACKFILL		DETAIL:	509(B)